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1859.

PACIFIC WAGON ROADS.

LETTER

FROM THE

SECRETARY OF THE INTERIOR,

TRANSMITTING

A report upon the several wagon roads constructed under the direction of the Interior Department.

March 1, 1859.—Laid on the table and ordered to be printed.

Department of the Interior,
February 23, 1859.

Sir: I have the honor to transmit herewith reports, with maps, upon the several wagon roads constructed under the direction of the department, under the provisions of the acts of Congress approved July 22, 1856, February 17 and March 3, 1857, respectively.

I am, sir, respectfully, your obedient servant,

J. THOMPSON, *Secretary.*

Hon. James L. Orr,
Speaker of the House of Representatives.

REPORT

UPON

THE PACIFIC WAGON ROADS,

CONSTRUCTED

Under the direction of the Hon. Jacob Thompson, Secretary of the Interior, in 1857-'58-'59.

BY ALBERT H. CAMPBELL, *General Superintendent, &c.*

DEPARTMENT OF THE INTERIOR,
Pacific Wagon Road Office, February 19, 1859.

SIR: I have the honor to submit the following brief report upon the operations of the several wagon road expeditions organized under the provisions of the acts of Congress approved July 22, 1856, February 17, 1857, and March 3, 1857, respectively, the general management of which you have entrusted to me.

FORT RIDGELEY AND SOUTH PASS ROAD.

On the 25th of April, 1857, new instructions were issued to Mr. William H. Nobles, who was continued as superintendent of the Fort Ridgeley and South Pass road. These instructions were substantially the same as those given him by the Commissioner of Indian Affairs, September 18, 1856, in reference to the character of the road to be constructed.

On receipt of these instructions Mr. Nobles proceeded to St. Paul to perfect his organization, from which place he reported on the 15th of May that he had purchased a portion of his outfit, and could start about the 26th, but that he should be delayed in his departure from that place one or two weeks, in consequence of the unusually severe and backward season, preventing the growth of grass. On the 19th of June Mr. Nobles left St. Paul, his party starting the two days previous for Fort Ridgley, to prosecute the work assigned him, the provisions having been sent forward nearly a month previous by steamboat up the Minnesota river to the point of rendezvous. A despatch dated July 14, Big Sioux river, announcing his arrival and the progress of the work to that place, and expressing his apprehension in regard to Indians retarding his further progress, was received on the

8th of August at the department, two days after the receipt of a more detailed account, dated St. Paul, Minnesota Territory, July 30, announcing his arrival in St. Paul two days previous for ammunition, and giving an account of the opposition of the Ihankton Indians to his progress through their country. This opposition to passing through their country Mr. Nobles says arose from "no particular enmity to his progress through their country, provided they were compensated for the right of way."

On the 25th of September Mr. Nobles writes from St. Paul, Minnesota Territory, announcing his return to that place, having left his party on the 18th of that month on the Big Sioux, engaged in completing a portion of the road in that vicinity. In this letter Mr. Nobles expressed his great pleasure in informing the department of the entire success of his expedition, and reports a road "from the Big Sioux river to the Missouri, over which any team can pass, and through a country inviting to the emigrant."

This road was completed only as far as the Missouri river, 254 miles, some time in the fall of 1857, in consequence of the insufficiency of the appropriation and of alleged Indian hostilities. The general location of this road is as follows: beginning at the ferry on the Minnesota river, which is 150 feet wide at this place, opposite Fort Ridgeley, the general course of the road is southwesterly, passing through a marshy region a few miles south of Limping Devil's Lake to the north fork of the Cottonwood, a distance of about 17 miles, thence to the Cottonwood river, over a rolling country, with lakes and marshes, about 1½ mile below the mouth of Plum creek, distance about 19 miles. From this point the road continues across Plum creek and three good watering places to the crossing of Cottonwood at Big Wood, about 18½ miles. Thence the road continues to Hole-in-the-Mountain, near Lake Benton, a distance of about 32 miles, passing through a region abounding in lakes and an abundance of wood, water, and grass. From Lake Benton the road passes for the most part over a high prairie to the Big Sioux river, about 23½ miles. From the Big Sioux to James river, about 62½ miles, "is a vast sandy prairie, with no timber whatever." This timberless prairie extends to the Coteau du Missouri, 23 miles from James river. From Coteau du Missouri to the Missouri river, distance about 60 miles, the country is represented as being gently undulating until the tributaries of the Missouri are reached, it then becomes more broken. The longest distance on this entire road between water is 19 miles, and this occurs between the edge of the Coteau and Crow creek.

This road, as far as built, is remarkably direct, and is believed, from the description of the country through which it passes, to be the best location which could have been made, securing a plentiful supply of water, grass, and timber.

The report of the superintendent, and the very able and interesting report and map of Samuel A. Medary, engineer, herewith transmitted, will give a detailed account of the operations on this road, as well as a description of the country passed over.

FORT KEARNEY, SOUTH PASS, AND HONEY LAKE ROAD.

Eastern division.

This road being about 1,400 miles in length, for the sake of economy and convenience of construction was divided into three divisions, viz: the first extending from Fort Kearney to Independence Rock; the second from Independence Rock to City Rocks; and the third from the City Rocks to the eastern boundary of California, near Honey Lake valley. The plan of operations adopted to secure the rapid construction of this road, was as follows: The superintendent of the Fort Ridgeley and South Pass road was instructed to return after completing his operations on that road from Independence Rock to Fort Kearney, improving so much of this road as required it; the particular points to which the attention of the department had been called as needing material improvement were Scott's Bluffs, Ash Hollow and Plum Creek. This portion of his instructions, however, were not complied with for reasons previously assigned.

The superintendent of the eastern and middle divisions, Mr. Wm. M. F. Magraw, to whom instructions were handed on May 1, 1857, was directed to repair as rapidly as possible over the first division, improving so much of the road only as would facilitate the movements of his own train, and commence at Independence Rock and improve the present road from that point to near the summit of the South Pass, and thence to City Rocks, to open a new road to avoid the detour *via* Salt Lake City and by Bear river, &c. It had been suggested that a good route for a wagon road exists from the summit of the South Pass running near the base of the Wind River mountains; thence in a direct line to Beer or Soda Springs on Bear river, crossing Green river near the New Forks; thence from Beer Springs *via* Thousand Spring valley, north of the Humboldt, to the Mud lakes.* To test the practicability of a portion of this route, which promised so much in point of distance, and affording better grass and a greater and more permanent supply of water than the present travelled roads, besides avoiding the Green River deserts and at the same time offering superior advantages to the Oregon emigrant, as a glance at the map will show, the superintendent was empowered to send a party in advance in charge of F. W. Lander, his chief engineer, who had been selected by the department for his eminent qualifications for that service, having crossed the continent a few years ago *via* the South Pass, exploring for a practicable route for a railroad from the Mississippi river to the Pacific coast. Mr. Lander was instructed to thoroughly examine the Bear River mountains "between the trail *via* Ham's Fork and the head waters of Port Neuf or some other tributary of Snake river, and from such a point as he might discover in these mountains to City Rocks."

The advance party, under the chief engineer, left the frontier on the 15th of June, 1857, and reached the South Pass on the 15th of July.

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* In a letter of W. H. Nobles to the Secretary of the Interior, March 26, 1857.

His party was divided into three divisions, for the thorough exploration of the Wasatch mountains and the upper basin of Green river. These explorations were accomplished with remarkable energy, and having accomplished them to his satisfaction, proceeded to the South Pass to meet the superintendent, which he did on the 22d of September, having travelled with his several small parties several thousand miles. A report and map of these explorations were furnished the superintendent, and the latter subsequently passed into the hands of the commander of the army of Utah, and is said to have been of material service to that officer.

The superintendent and his party left Independence about the 1st July, 1857, and reached the head waters of the Sweetwater in the latter part of September of the same year, too late to proceed with safety through the South Pass and into the Wasatch range, in consequence of the severity of the winter in that region and the hostile attitude of the inhabitants of Utah toward the authorities of the United States at this time. The superintendent was compelled therefore to seek suitable winter quarters, which he did on Popo Agie, a tributary of Wind river. Here the party was disorganized, a portion of the employés returned to the frontier, a portion accompanied the chief engineer to this city to report upon the operations of his advance corps, a small force was left on Popo Agie in charge of the public property, and a large number volunteered into the service of the army of Utah, selecting their superintendent as their captain; their services were accepted by the proper officer in command, and a large portion of the mules, and wagons, and other property of the expedition was turned over to him for the use of the army.

The accompanying report of the chief engineer of the results of his explorations west of the South Pass is herewith submitted.

The superintendent having vacated his commission, by volunteering into the service of the army of Utah, the chief engineer, Mr. F. W. Lander, was appointed to the superintendency of this road, and received instructions to carry out in the main the instructions originally given to his predecessor. His party left the frontier about the 1st of May last, and, being equipped for rapid movement, reached the South Pass, the point of beginning their operations, 950 miles from the starting point, on the 14th of June following. Immediately on the arrival of this party at the South Pass, preparations were made by Mr. Lander for the location and construction of the road. Having secured the services of sufficient number of laborers, many of them Mormons from Salt Lake City, a vigorous prosecution of the work was commenced. Mr. Lander was instructed to open a road from the South Pass of the Rocky mountains to the City Rocks, or north fork of the Humboldt river, *via* Thompson's or McDougal's Passes; that is to say, along what is designated in his report of November 30, 1857, and on the map* acccompanying it, as the "Northern Route." From the very extensive explorations of Mr. Lander in the summer of 1857, developing several prrcticable routes for roads through a region of country abounding in nutritious grasses, permanent supplies of water, and timber for fuel and for building purposes, it was deemed important to open this route, in view of the large emigration which annually passes overland to the Pacific shores, and in view also of the unsettled condition of affairs in the vicinity of Salt Lake City at the time. The road, as now located, will, it is believed, be of incalculable advantage to the Oregon and California emigration, particularly to that portion of it which contemplates making the entire march from the Mississippi valley to California, or to the settlements of Oregon, in one season. The overland emigration reaches the vicinity of the South Pass toward the end of July, and by adopting the route now open to them they will avoid the artemisia barrens of the Green River basin, with its deleterious waters, and the rugged defiles of the Wasatch mountains, leading to Salt Lake City, and the circuitous route by the valley of Bear river. "The passage of the line, as located nearer to the base of the snow-capped mountains in a more elevated region, richly grassed, and along the great summer trails of the Indians, is favorable to their health, the preservation of their stock, and gives them abundance of pasturage, with water at short intervals from mountain streams."

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* This map has been replaced by a map accompanying Mr. Lander's report of January 20, 1859.

The direct road from the South Pass to Beer or Soda Springs, on Bear river, which had been suggested, as above referred to, as feasible and of easy construction, it will be seen by Mr. Lander's report and map, is in part impracticable. The Wasatch and Bear River mountains, between Thompson's Pass and the mouth of Tulick's fork of Bear river, are represented as being very rugged and covered with dense pine forests, requiring expensive grading and extensive cutting through pine timber.

The location of this road, as constructed by Mr. Lander, is as follows: Beginning at Gilbert's trading station, in the South Pass, it passes along the base of the Wind River mountains, heading Little and Big Sandy creeks; thence west, across the Green River basin, crossing the New Fork, Green River, and White Clay and Bitter-root creeks to the valley of Piney creek; thence up this valley through Thompson's Pass to the headwaters of Labarge creek; thence, *via* the head of Smith's fork of Bear river to the valley of Salt river. The road continues down this fertile valley about twenty-one miles to Smoking creek; thence up the valley of this creek to the head of Blackfoot creek, and the valley of John Gray's lake to Blackfoot creek, lower down; thence over to Ross creek. Passing several miles down this creek the road crosses over to Snake river or Lewis' fork of the Columbia, near the mouth of Pannock river; thence down the valley of Snake river to the valley of Raft river; thence up this valley direct to City Rocks; a total distance of 345.54 miles from Gilbert station at the South Pass, and 950.54 miles from Fort Kearney. From City Rocks to Honey Lake valley, by the survey of Superintendent Kirk, is 436.93 miles. The total length, therefore, of this entire road is 1,387.47 miles.

From a tabular statement in Mr. Lander's report it will be seen that over sixty-two thousand cubic yards of earth and rock have been removed, eleven miles of willow, and twenty-three miles of heavv pine timber cleared from the roadway.

Mr. Lander represents the agricultural and pastoral resources of th country traversed by this road as highly favorable. The western be of the Wind River mountains and the upper basin of Green riv afford fine pasturage, and many valleys are adapted for settlement On the headwaters of Snake and Blackfoot rivers, large crops of whe and barley have been raised. All the great tributaries of Upper Gre river have their sources in the Wind River and Wasatch mountai and are well timbered with yellow pine. The tributaries of the upp Snake river are also heavily timbered. The Mormons have extende their settlement a considerable distance into the region of countr through which this road passes, and should it come to be a thoroughfare it will doubtless be thickly populated.

In connexion with his report, Mr. Lander presents an interestin account of his intercourse with the Indian tribes, through whose rang this road passes. He speaks of the Shoshonees particularly, as bein friendly disposed toward the whites, and makes several suggestion with regard to maintaining this friendly feeling toward this and othe tribes, to which I would respectfully call your attention. The Snake have received very little attention hitherto from the authorities of the United States, and frequent wars with their powerful neighbors, the Blackfeet and Crows, have compelled them in a manner to withdr from the buffalo range and keep within the mountain fastnesses, whe they derive a scanty subsistence from roots and the smaller game. Th effect of opening an emigrant road through this country will be disastrous to their means of subsistence, by destroying their root grounds and driving away their game, and expose them also to the wanton annoyance of a class of emigrants, who never avoid an opportunity of attacking small bands of Indians whenever they are met with. This inevitable result, Mr. Lander very justly argues, will provoke their hostility and involve the government in an expensive war. By the judicious distribution of a few thousand dollars worth of suitabl goods and implements among them, with encouragement to preserv peaceful relations with the whites, and devote their energies to developing the resources of the country, by the production of grain and vegetables, and other articles suited to the wants of emigrants, this interesting people may be gradually brought to the knowledge and practice of the arts of civilization. Without some such provision being made, Mr. Lander states that a much larger force will be necessary to continue operations in that country than would otherwise be required.

Western Division.

The western division of this road extends from City Rocks to the California line at Honey Lake valley.

The superintendent of this division, Mr. John Kirk, was instructed to organize his force at Placerville, California, and select a road from Honey Lake valley to City Rocks, avoiding as much as possible the Humboldt, St. Mary's, or Ogden's river, leaving it to the south. The alleged deleterious character of the waters of this river, and its destructive effects upon cattle and horses, renders it advisable to avoid it as much as possible. Instructions were handed Mr. Kirk on May 1, 1857. On the fifth he embarked for California, where he arrived on the thirtieth. He organized a party, and started, *via* Carson's valley, for Honey Lake valley, the point of beginning, on the 27th of June; reached City Rocks, the eastern terminus of his division, about the 1st of September, 1857, and returned thence to Placerville, where his party was disbanded. His report and map will be found accompanying, and will give the details and results of his operations.

Mr. Kirk and his engineer, Mr. Bishop, both agree that the only route for a wagon road between City Rocks and the Great Bend of the Humboldt river is in the valley of this river. The distance from Honey Lake valley to City Rocks, by the route surveyed by Mr. Bishop, is 436.93 miles.

EL PASO AND FORT YUMA ROAD.

Instructions were issued to James B. Leach, the superintendent of this road, on May 9, 1857. He was directed to proceed to Memphis, Tennessee, to organize a partial force and travel by as direct a line as possible from that place to opposite El Paso, on the Rio Grande, the initial point of his operations. From Memphis to the Rio Grande he was instructed to collect such information and make such surveys as the progress of his march would admit of, with reference to the character of the country and its capabilities for maintaining a good wagon road.

With the supplies, instruments, and tools for the expedition, this party left the west bank of the Mississippi river, opposite the city of Memphis, Tennessee, on July 1, 1857, and arrived at Des Arc, on White river, in Arkansas, on the 8th, (97.1 miles from Memphis.) Here the wagons were reloaded, a portion of the freight being left to be conveyed by the ox train, which was expected to follow the mule or advance train very soon. The mule train left Des Arc on the 17th of July, crossed the Arkansas river at Little Rock, (148.6 miles from Memphis,) on the 19th, reached Doaksville, in the Choctaw country, (380 miles,) on the 13th of August. The recent and long continued rains rendered the roads generally heavy, and in many places almost impassable, consequently much time was lost and labor required in getting the train over this portion of the route. Leaving Doaksville on the 17th of August the train crossed Red river at Preston, (472 miles,) on the 22d reached Fort Belknap and the Brazos river, (635.4 miles,) on the 1st September, passed old Fort Phantom Hill, (709 miles,) on the 8th, Fort Chadbourne, (767 miles,) on the 12th, the Mustang Ponds, (915 miles,) on the 27th, and reached the Pecos river, at the "Horsehead" crossing, (961 miles,) on the 29th. Left the west bank of the Pecos October 1st, passed Comanche Springs, on road from San Antonio to El Paso, (1,027 miles,) on the 5th, Fort Davis, (1,100 miles,) on the 8th, Rio Grande, (1,225 miles,) on the 16th, and arrived at Franklin, opposite El Paso, (1,309½ miles from Memphis,) on the 22d of October.

Franklin being the eastern terminus and initial point of the road to be constructed, three parties were immediately organized and the construction of the road commenced, which was continued without intermission or suspension, except the necessary delay in the movement of the working parties along the route, from October 25, 1857, to August 1, 1858, at which time the advanced state of the work authorized a reduction of the laborers employed, and rendered unnecessary a large portion of the outfit, embracing mules, oxen, wagons, tools, &c., which were sold at public auction, in La Mesilla, on the 1st of August. With the reduced force, the superintendent and chief engineer again passed over the road from La Mesilla to Fort Yuma, to make additional improvements, as well as to secure and render more certain an abundant supply of permanent water, reached Fort Yuma about October 1, proceeded to San Diego, sold the property and disbanded the party on October 16, 1858, and leaving California on the 20th November reached Washington on December 10, 1858.

Location of the road.—Beginning at Franklin (opposite El Paso,) the road proceeds up the valley on the east side of the Rio Grande, touching the river at convenient points for water, crosses it near La Mesilla and continues up the valley, on the west side, to the Picacho, (51.5 miles from Franklin;) thence, turning westwardly, ascends the Mesa and passes over a gently undulating prairie to Cook's Springs, (101.4 miles;) thence through the favorable pass in the Mimbres mountains, crossing the Rio Mimbres directly to Ojo de la Vaca, (134.5 miles,) passing the southern edge of the Burro range of mountains to Ojo Excavado, (147.6 miles,) through the Peloncillo pass, (187.7 miles,) crossing the Rio de Sauz (201.7 miles) directly to Parke's railroad pass, (between the Chericahui and Pineleña mountains, 231 miles,) to Croton Springs, (248.7 miles;) thence through Nugent's pass, in the San Calistro range, to the Rio San Pedro, (271.5 miles,) down the valley, on the east side of the river, to the junction of the Rio Aravaypa, (328.1 miles, and 15 miles from the Rio Gila;) then crossing the Rio San Pedro the road continues, by a very favorable pass in the Santa Catarina range, directly to and striking the Gila (375.2) 21 miles east of the Pimos villages; thence by the Maricopa Wells down the valley, on the south side of the Rio Gila, to Fort Yuma, the western terminal point of the road, (573.1 miles from Franklin,) making the new road about 40 miles less in length than the old travelled road *via* the Puerto del Dado or Apache Pass, Tucson, &c.

Construction of the road, character of work, &c.—The excavation, owing to the generally smooth or gently undulating surface of the prairies and valleys, and very favorable mountain passes of the country traversed by the road, was not very heavy or expensive, but confined chiefly to "side cutting," in making the road around the rocky hills and bluffs in the vicinity of Franklin, at the Picacho, (opposite Doña Ana,) in ascending the Mesa, from the valley of the Rio Grande and along the valleys of the San Pedro and Gila rivers, turning the points of mesas and rocky bluffs, or keeping the roadway above the wet and marshy bottoms; also, wherever it was required, to make easier the crossings of the arroyos and streams, or more gentle and gradual the ascents and descents of the mountain passes.

The road-bed was cleared of boulders and loose or detached rock, as well as brush, throughout its entire length, requiring much time and labor, especially in the valleys of the San Pedro and Gila rivers. All the springs and permanent watering places were improved and made easy of access, and the supply of water rendered ample to meet the demands of the stage and emigrant trains at all seasons. Where permanent water was not found at suitable points, reservoirs were constructed, either by damming the arroyos or sinking large tanks to collect and retain a supply of rain water.

The tabular statement of the localities of the most convenient watering points, with the required facilities for camp purposes, shows how abundantly the country along the road supplies the great desiderata of travellers across the plains, wood, water, and grass. The soil, generally a mixture of coarse sand, clay, and gravel, is very favorable to the formation of a good and durable road-bed, which a little use will render hard, compact, and smooth.

The gradients and curvature of the road are comparatively light and offer no obstruction to the rapid transit of vehicles of any description. The crossing of the Rio Grande is effected with much trouble and difficulty by fording at low stages of water, owing to the quicksand in the channel, and at high water the rapidity of the current makes the ferrying tedious and dangerous. The Mimbres and San Pedro are small streams and are readily forded at all seasons; the Colorado is crossed by ferry.

In reviewing the improvements effected by this line of location, and the labor executed upon it, it will be found that there is a saving of distance between the termini of $47\frac{54}{100}$ miles; an increase of over seventy (70) miles along running water; a reduction of the greatest distance between camps to 27 miles by the construction and improvement of six new watering places; and the reduction of all gradients to a slope easily passed over by loaded wagons drawing a maximum load, which, for six mules, is 4,000 pounds, and for ten mules, 6,000 pounds; and the opening to settlers and emigrants of the valleys of the San Pedro and Gila rivers.

The effect of these improvements amounts to a saving in time, with loaded wagons, of about five (5) travelling days between El Paso and Fort Yuma.

The able and interesting report of Mr. N. H. Hutton, who was selected as the engineer of this road on account of his familiarity with the country through which it passes, will give a more detailed account of the results of the operations upon this work, from which it will be seen that over fifty-seven thousand cubic yards of earth and rock have been removed, and an increase in watering facilities of over three hundred thousand gallons afforded.

NEBRASKA ROAD.

Instructions were sent to George L. Sites, the superintendent of this road, at Fort Wayne, Indiana, May 19, 1857, with directions to proceed at once to the Platte river, and, with his engineer, make a rapid reconnaissance of the whole route, with a view to a judicious and economical expenditure of the sum appropriated throughout the entire distance. Two reports, which are herewith submitted, dated respectively July 10th and August 10th, were received from Superintendent Sites; the first comprising the results of his examinations between the Platte river and Dacota City, and the second his operations between the latter place and the l'Eau qui Court, (Running Water river.) Mr. Sites, in these reports, and in a subsequent report dated March 4, 1858, expresses the opinion that a good road could and would be built by him, including several important bridges, with the appropriation.

This road was commenced in June, 1857, and was located up the valley of the Pappillion, *via* Belleview, thence to Omaha City, and from this place to Saratoga, and thence through Florence over the "second bottom lands" of the Missouri, crossing Spring and Mill creeks, to the bluffs of the Missouri, five miles from the bridge erected on the military road from Omaha City to Fort Kearney; crossing here a high ridge, the road passes down the valley of Poncas creek for one mile, and thence over to the valley of Deer creek; thence over to the second bottom lands of the Missouri, crossing Turkey creek, to the town of Fort Calhoun. From Fort Calhoun the road continues along the bottom lands of the Missouri, crossing Moore, Mill, and Glover creeks to Desota. From this point the road passes over the highlands and across the bottom lands to Cumming City, and thence to Tekama, crossing North, Stewart's, New York, Pike Spring, and Dry creeks. From Tekama the road bears to the west of north crossing Silver and Elm creeks, and reaches Decatur City. From Decatur City the road passes through the Blackland hills to the town of Omadi, and thence to Dacota City—105 miles from the Platte river. From Dacota to Niobrara, at the mouth of the Running Water river, (l'Eau qui Court,) the distance is 100 miles; and from the Platte to Niobrara, the terminus of the road, 205 miles. The entire country passed over by this road is represented to be rich, and well adapted to agricultural and pastoral pursuits. The accompanying reports and map of the superintendent will afford a more detailed statement of this road, which was completed so far as Dacota City before the close of the year 1857. The superintendent was instructed early last spring to resume his operations, with a view to the completion of the road from Dacota to Niobrara.

The final report of Mr. Sites, dated January 20, 1859, herewith submitted, gives a general resumé of his operations to the close of the work; by reference to which it will be seen that he has constructed fifty-one bridges, of various sizes, ranging from seven to seventy-eight feet in length, besides excavation and other work necessary to render the road passable and of a permanent character.

This road having been judiciously located by Mr. Sites, appears to have given great satisfaction to the people of Nebraska; and it is believed that it will assist greatly in developing the resources of that region by affording a ready means of communication between the various settlements along its course.

I am, sir, very respectfully, your obedient servant,

ALBERT H. CAMPBELL,
General Superintendent Pacific Wagon Roads.

Hon. JACOB THOMPSON,
Secretary of the Interior.

Report of Superintendent William H. Nobles upon the Fort Ridgeley and South Pass Wagon Road, constructed under the direction of the Department of the Interior, 1856–'57–'58.

WASHINGTON, D. C., *January* 18, 1858.

SIR: I have the honor herewith to transmit my report, with accompanying map of the route; also a journal of daily operations and engineer's report, being a full statement of the operations of the expedition under my charge for the purpose of building a wagon road from Fort Ridgeley to the South Pass of the Rocky mountains, as provided for by acts of Congress.

The late date of the starting of the expedition from St. Paul, owing to the absence of funds to pay for the necessary outfit, prevented my completing my portion of the road this season further than the Missouri river.

I have to report that I have located and *built* a good wagon road from Fort Ridgeley to the Missouri river, in lat. 43° 47′, between Bijou hill and Fort "Lookout."

The road has been selected and made with a view to accommodate the emigrant, by having it pass through a good country and in the vicinity of wood and water; and also, with these valuable considerations always in sight, I have been able to complete the road in almost a direct line from Fort Ridgeley to the terminus on the Missouri river.

The topography of the country is principally of a level prairie character, and presents but few serious obstacle to the traveller, and a train with heavily loaded wagons can *now* pass to the Missouri, without once unloading or doubling of teams.

The rivers on the road to be crossed are—

North branch of the Cottonwood river.
Cottonwood river, (twice.)
Redwood river.
Medary creek.
Big Sioux river.
Perrine creek.
Rivière du Jacques or James river.
Beside a number of small creeks.

On the Cottonwood river I have constructed a rough bridge adapted to the present travel, but it is important that this river should be well bridged at both of the crossings. The rapid flow of emigration to this section of country also demands that these bridges be immediately constructed.

I have caused a good fording to be made across the Big Sioux river. The banks of this stream are firm and substantial and well timbered.

The bed of the river I paved with boulders and gravelled the same. So that there will be no difficulty in the way of teams passing across at any stage of water during the year.

I have also pursued the same course with the Rivière du Jacques or James river; but the bottom lands of this stream are low and wide and in the spring are overflowed, but I do not apprehend that t stream is ever too deep to present serious impediments to trains. expended a great deal of labor on this ford, having to haul ston great distance.

I beg to refer you for full particulars in reference to the strea along the route to the "Itinerary," and able report of the engin

The country situated between the Minnesota river and the B Sioux, comprising the Cottonwood valley, is rich prairie land wi numerous small lakes scattered along.

The Cottonwood river is timbered, and the numerous lakes also ha timber on their margins.

These lakes are filled with good clear water, and exist along th entire route to the Missouri river, and are at convenient distances f watering places.

The land between the Big Sioux and Rivière du Jacques, or Jam is a vast sandy prairie with no timber whatever; this prairie cro the Rivière du Jacques and extends to the Coteau du Missouri, wh the country assumes new features, becoming hilly with small cre emptying into the Missouri.

The land situated on these creeks is rich and generally covered wi timber.

There are but two or three hills along the road that present ob stacles, and those I have graded, so that the ascent and descent will be easily accomplished.

The most serious hills, are the bluffs along the Missouri river and the Coteau hills along the James river valley.

In making the approach to the Missouri river I found the bluffs hig and precipitous, except at the mouth of Crow creek, and experienced a good deal of difficulty in selecting a place through which I could construct a road to the river; this was accomplished at last, and as near to the Bijou hill as the country permitted, in accordance with the wish of the department as expressed in my instructions.

At the outset of the expedition I was met by a large number of "Ihankton" Indians in the vicinity of Lake Benton, who warned me from entering their country, intimating if I crossed the Sioux river I must expect resistance from the "Ihankton" tribes.

At this time most alarming accounts had been received from the Yellow Medicine, and messengers were going through the country preparing the frontiers in anticipation of a general Indian war.

It placed me in a precarious situation to enter the country of hostile Indians who openly threatened me, and also to have in my rear all of the Sioux tribes at war with the whites.

In view of these difficulties I returned to my former camp on the Cottonwood river, and employed my men bridging that stream, and repairing wagons, harness, &c., while I could obtain information from "Yellow Medicine."

I hastened to the scene of difficulties, and, after consulting with Mr. Superintendent Cullen and Major Sherman, then in command at that place, I decided upon obtaining more and *better* ammunition and push on through their country. Having supplied myself with such ammunition, I recrossed the Sioux, conciliating the Indians with suitable presents, and met with no further opposition from them.

I have no reason to believe that the Indians in that country will ever interfere with travellers over "that road."

I have caused to be erected along the route about 1,500 mounds; these mounds are from three to five feet in height, and are distant from each other about one-fourth of a mile.

The Missouri river is well timbered at the terminus of the road; the bottom lands are very rich, and present a fine field for the settler.

I have erected on the Cottonwood river a substantial log-house, with a store-room, &c., and have placed the stock and property in charge of a small number of men. I have also erected good stables for the protection of the animals; cut and secured hay sufficient, I think, to keep them through an ordinary winter.

The stock are generally in good condition, excepting the horses, which do not thrive without grain. I have lost a number of horses from no other reason than the absence of such provender.

I believe that mules and oxen are the more profitable stock for an expedition of this character.

The climate is temperate and very regular. The thermometrical observations for the trip average as follows:

	Sunrise.	Noon.	Sundown.
July..............................	62°	82°	72°
August	56	78	72
September.......................	49	70	61

During these months the winds were fresh and usually from the south.

The distance from Fort Ridgeley and the Missouri, as measured by the odometer, is 254 miles; the road is a few miles longer than it was possible to make it in order to have it practicable at all seasons of the year.

The distance from Fort Ridegley to the South Pass, by this road, I believe to be at least 250 miles shorter than from Fort Leavenworth, on the Missouri, to the South Pass. This is a most valuable consideration for the emigrant, as well as claiming the attention of our countrymen in reference to the best route of the Pacific railroad.

In concluding my report, I beg to avail myself of this opportunity of recalling the circumstances which prevented the completion of my section of the road.

A delay of from six to eight weeks was experienced at St. Paul and vicinity, owing to the absence of funds to provide for the outfit, as explained in my correspondence of May and June to your department. This unanticipated delay caused my arrival on the Missouri river to be at a season when to have crossed it would have exposed the entire train to loss from lack of forage for the cattle.

In September, when I was encamped on the Missouri river, the grass was dried up and burning, and to have pushed further on would have been not merely of no avail but ruinous.

But for the unforeseen delay at the outset I could have completed my section, and also have avoided the extra expense of provisions and a full complement of men requisite for the entire trip.

It was contemplated, in making up my outfit of provisions, to provide for the sustenance of the full number of men necessary for the trip to Independence Rock and then to Fort Kearney; and I was advised by your department that the sum of $20,000 was placed to the credit of my portion of the road, in addition to the appropriation for the Fort Ridgeley and South Pass wagon road, and my instructions were to get up the outfit accordingly.

In thus providing the outfit and the wages of the men the Fort Ridgeley and South Pass wagon road appropriation has been exhausted, and I have drawn upon the $20,000 allowed me out of the $30,000 appropriated by Congress last year for the completion of that road only to the extent of not exceeding ($10,000) ten thousand dollars.

Could I have started as soon as my outfit was complete, I should have completed the road to Independence Rock and thence to Fort Kearney, and not have exhausted the $20,000 allowed me.

I regret that I cannot hand in the report of the surgeon, J. D. Goodrich. On my arrival at St. Paul he received news of the dangerous illness of his wife, and was compelled to hasten to her, and up to date has been unable to leave her.

The important observations and thermometrical record, together with a collection of flora of the country gathered by him, I herewith transmit; and as soon as I receive his report in full shall have the honor to transmit the same to you.

I take great pleasure in making favorable mention of my assistants, from all of whom I have received cheerful support.

I have the honor to be, very respectfully, your most obedient servant,

WM. H. NOBLES,
Sup't of the Fort Ridgeley and South Pass Wagon Road.

Honorable Jacob Thompson,
Secretary of the Interior.

FORT RIDGELEY AND SOUTH PASS WAGON ROAD.

Report of Samuel A. Medary, Engineer, to W. H. Nobles, Superintendent.

ST. PAUL, MINNESOTA, *December*, 1857.

SIR: In accordance with my instructions, I have the honor herewith to submit my report, accompanied with a map of the located line of the "Fort Ridgeley and South Pass Wagon Road," to the crossing of the Missouri river, with field notes of the same.

Very respectfully, your most obedient servant,

SAMUEL A. MEDARY,
Engineer.

WILLIAM H. NOBLES,
Superintendent, &c., &c.

Engineer's Report.

The initial point of the road is at the landing of the Fort Ridgeley ferry, on the west bank of the Minnesota river, agreeable to instructions from the Department of the Interior.

The first ($\frac{7}{10}$) seven-tenth mile of the road passes through a heavily timbered bottom, subject to inundation.

The road way is cut out (30) thirty feet in width; four hundred and thirty feet of the distance is through a grassy marsh, usually covered with from five to ten inches of water; this marsh has been a serious obstruction to military trains going west from Fort Ridgeley, as a greater portion of the year they have been compelled to cross the Minnesota river at the Lower Sioux Agency, (13 miles above,) to avoid it.

This obstacle is now overcome by a timber road bed, twelve feet in width, covered with earth and ditched.

Leaving the bottom land the road ascends to the high prairie by the most favorable of the boulees or ravines; yet such is the ascent that, with the improvement of excavation and embankment, the average grade for one thousand feet is about seven hundred feet to the mile.

From the top of the bluff, 140 feet above high water mark, to the northern branch of the Cottonwood river, the road for sixteen miles passes over undulating prairies, interspersed with grassy lakes, near which is good grazing, but no wood.

A crossing of the north branch was made as soon as the stream, which heads in "Limping Devil's" lake, and the surrounding marshes, became well defined.

This stream has a sluggish current, and partakes, except after heavy rains, more of the nature of a slough. Its banks are low and soft, and present no reliable place for fording.

A bridge of 12 feet span and eight feet rise, (its cost not to exceed $200,) would obviate the uncertainty of a ford, timber for which could be obtained from the bottoms of the Minnesota river. There is n fuel of any description at this point, but the grazing is good.

From the north branch to the lower crossing of the main stream, (19½) nineteen and a half miles, the prairie becomes more undulating, until broken by the bluffs of the Big Cottonwood river.

The Cottonwood is a clear, rapid stream, with well defined banks; its bed, seventeen feet in width, is of gravel overlying blue clay. As the ford was selected at one of the rapids of the stream, high water mark does not indicate more than four feet rise at any season, and a safe crossing can always be made. A bridge, however, is required at this point. Good bridge timber can be procured in the immediate vicinity. The cost of this bridge will not exceed ($750) seven hundred and fifty dollars.

The bottoms of the Cottonwood average three-fourths of a mile in width, of rich black sandy loam, covered with a luxuriant growth of grass; a skirting of timber extends the whole length of the stream, with occasional groves of cottonwood, oak, elm, ash, and hickory; the heavier portions of the timber are found near the mouth of the stream.

From the "lower crossing" the road passes over the divide between the main stream and its principal southern tributary, "Plum creek," a distance of four miles, this tributary, skirted with timber, flows rapidly between high banks.

The country in the vicinity is of first rate soil, affording good grazing and agricultural lands.

From Plum creek begins the first perceptible ascent toward the Coteau des Prairies. Running south of the "Big North Bend" of the Cottonwood, an air-line road of fourteen and a half miles extends to the "Big Woods," or upper crossing, over dry prairie land. In this distance the road crosses three small tributaries of the Cottonwood river, which have well defined banks and contain water at all seasons. At the upper crossing the bed of the stream is soft and scarcely fordable, while the bluffs are high and abrupt.

A bridge of seventeen feet span, crib abutments, and a rise of twelve feet, was constructed of round oak timber, not less than ten inches in diameter, with puncheon flooring well pinned down. The bluff on the south side rises abruptly nearly eighty feet. Heavy side hill cutting was necessary, by which an average grade of one in eleven for four hundred feet was obtained. But little work was necessary on the north side, an easy grade being procured over the natural surface. Within six miles of the upper crossing the Cottonwood takes its rise in numerous chalybeate springs; the water was drank freely by our animals, but owing to the earthy salts held in solution it is unfit for washing. A few soft water springs mingle with the former, and two miles below the crossing a succession of them occurs. Groves of cottonwood, oak, and elm, are scattered on the bottoms and in the ravines in this vicinity.

The soil of the prairie is a rich, brown sandy loam, that of the bottoms a vegetable decomposition, varying in depth from ten inches to three feet, covered with a heavy undergrowth of hazel and plum.

By making two crossings of the Cottonwood river, the low marshy country between it and the Redwood creek on the north is avoided.

In passing over the country between these two streams last fall, while making a reconnaissance of this portion of the work or route, it was supposed that a direct course from Fort Ridgeley to Lake Benton would be practicable. The ground was frozen at the time, and a portion of it covered with snow; the impracticability was clearly apparent on the opening of spring, when the true character of the surface was discovered.

The first five miles of the road, after leaving the upper crossing, is over level prairie; for the next two, the country is rolling and broken, until passing one of the heads of the stream, when the surface becomes more regular, extending five miles to Redwood creek. Both approaches to the Redwood are good. The prairie rises gradually from the creek on the east, but on the west the rise is more sudden, assuming something of a bluffy character. For nearly fifteen miles from this point the general course of the Redwood is northeast, its bluffy banks increasing in height and abruptness, until almost impassable for wagons. It is skirted with timber of the same description as that of the Cottonwood.

The bed of the Redwood, fifteen miles in width, is of gravel, containing also numbers of red granite boulders. Thirteen and a half miles of rolling prairie, interspersed with many small lakes and marshes, extend from the Redwood creek to "Acorn Planting." The planting ground of "Grizzly Bear," a chief of the Sissiton's, receives its name from the quantity of acorns found about it. Oak being the prevailing timber, of which there are several hundred acres in the immediate vicinity.

From "Acorn Planting" four and a half miles of level and two of broken country extend to Coteau Perceé creek, at the southwest end of Lake Benton.

Coteau Perceé creek, the outlet of Lake Benton, winds through an opening in the Coteau des Prairies, running in a southwesterly direction to the Big Sioux river. This opening, called the "Mountain Pass" or "Hole-in-the-Mountain," half a mile in width, is enclosed by irregular bluffs from two to three hundred feet in height. The surface of the valley thus formed descends imperceptibly to the Big Sioux river. It is the only route known favorable for a railroad, through or over the Coteau des Prairies.

At the southwest end of Lake Benton are fine groves of oak, ash, and elm timber. Ascending again from the valley of the Coteau Perceé creek to the high land, the road passes for seventeen miles over a level prairie covered with a coarse dark grass, without a shrub to relieve, or an undulation to break the monotony. Seven miles from the lake water is found in grassy pools near the head of a small tributary of the Sioux river, near which is good grazing. Within six miles of the Sioux river, a gradual descent begins toward Medary creek and the valley of the river. A fording of the creek is made without difficulty, its bed and banks being of gravel. It is a clear rapid stream, twenty-two feet wide at the ford, with banks seven feet in height; soft bottom lands, a mile wide, extend to the Sioux river, but it is seldom impassable for teams. The Big Sioux river, the second largest stream between the Minnesota and Missouri rivers, of sixty-two feet width, with a hard gravelly bed, is easily forded, and offers no obstruction to the road except during the spring freshets. The ford was greatly improved by laying large boulders across the stream, upon which gravel was thrown, partially raising its bed; the river is skirted with cottonwood, elm, and oak, a distance of twelve miles up the stream, the timber then ceases and does not again appear in any quantity; below it extends with occasional intervals to the Iowa State line.

The valley of the Sioux affords good grazing, and is susceptible of high cultivation. Above the crossing on the west side of the river the bottoms are low and wet, extending beyond the outlet of Lake Campbell, but at the crossing high bottom land begins, over which the road passes to the bluff, a mile and a half from the river. This high bottom land, seldom if ever overflowed, continues several miles south. From the bluff the road crosses the "divide" between the river and Perrine creek; this creek is crossed five and a half miles from the Sioux. It is a small, sluggish, grassy stream, subject to sudden rises, its banks are low and soft, while its narrow valley lies between high bluffs; the ford was improved by a pavement of flat stones, obtained from the surface of the adjoining prairies.

On this creek there is no wood, but at Lake Campbell, into which it empties, three miles north, a light growth of elm, oak, and cottonwood lines the banks.

Four miles further west Willow lake is passed, where a few willow and elm trees furnish indifferent fuel. On a small lake lying three-quarters of a mile north of the road and seven miles from Willow lake is the last road on the route until reaching the foot of the Coteau du Missouri, seventy miles distant. From the Big Sioux river to this last timbered lake, the prairies are rolling with occasional broken portions. Passing thirteen and a half miles further, over a level and undulating prairie, with occasional grassy lakes, an inlet of Lake Thompson is reached.

This lake, the largest on the route, about ten miles long north and south, by five or six in width, it appears has never been mentioned in any previous explorations, although a sheet of water larger and more pleasing than Lake Benton, even without possessing the groves of timber which decorate the shores of the latter, a few lone trees on its north bank being its quantum of timber.

On an elevation in the prairie, commanding an extensive view of the surrounding country, five miles before reaching the inlet of Lake Thompson, numerous excavations, ranged in a semi-circle, were discovered, which were supposed from their resemblance to be old Indian fortifications.

From Lake Thompson to Morse's creek, 18 miles, is over wavy prairie, the combs of which, extending north and south, occur every mile or two.

Five miles before reaching Morse's creek, Wolf branch is crossed. Its well defined, irregular banks make it visible for several miles when approached from the east. Water stands in gravelly bottomed pools; from the smaller ones, shaded by the long jointed grass from the sun, cool refreshing draughts of water were obtained.

Morse's creek, emptying in the James river about eight miles below the ford, seems to have its source in Lake Thompson. This creek was crossed over at a dry portion of its bed, upon which were indications of recent running water. A succession of pools, often ten feet deep, contain water at all seasons. At the deepest of these pools one or the other of the banks generally rise to a height of twenty or twenty-five feet, while on either side of the dry portions of the stream the banks seldom exceed four feet in height.

To the James river, fourteen and a half miles, the prairie gradually increases in its undulations until reaching the broken bluffs of the river. In this distance are no signs of water, and the growth of grass becomes short and thin.

The valley of the James, averaging a mile in width, lying between high uniform bluffs, is of a rich alluvial deposit, bearing a heavy growth of various grasses and forming a most excellent grazing country, with the one fault, lack of timber. At the mouth of Morse's creek, and for several miles up its valley, a few large elm and oak trees are found which, from the numerous remains of Indian camp fires near by, must have been found in greater numbers at an earlier day. At this point is the only timber for ten miles above or below the ford; neither is there drift wood along the banks of the river, which would indicate the presence of timber up the stream.

The drift of grass and weeds along the foot of the bluffs indicates the annual overflow of the whole valley, and the rise of the river to be about eighteen feet. The river, ninety feet in width, winds tortuously from bluff to bluff, rapidly but noiselessly. Its bed and banks are soft and miry. A good ford was constructed at the most favorable point by paving the bed and approaches with boulders and filling in with coarse gravel.

Leaving the valley of the James, a rolling prairie extends 52 miles to Sandy Hill creek, which is easily forded. What gave this creek its name as found on the maps received from the Interior Department is not apparent; nothing having the appearance of sandy hills was discovered within fifteen miles of the crossing. The name is calculated to give a wrong idea of the country in the vicinity of the road, which in reality is of good second rate soil, affording excellent grazing.

To the banks of the Plateau du Coteau du Missouri, seventeen and a half miles, is over a level prairie. Water is obtained once in this distance from a small marsh lying to the south of the road, almost hidden by the long grass. The Coteau rises abruptly out of the level prairie to elevations of from two to four hundred feet. The direction of the eastern façade is nearly north and south, running parallel with the James river from twenty to thirty miles distant.

At the base of the Coteau are several clear gushing springs, which lose themselves immediately in the light soil of the prairie. These springs furnish the only continually running water between the Big Sioux and Missouri rivers, excepting that of the James.

In the ravines in the face of the Coteau are considerable quantities of oak, ash, and elm timber of good growth. A favorable ascent of the Coteau was obtained on a narrow divide between the two ravines, which, extending nearly a mile into the lower prairie, formed an easy grade to the high land. Two miles over rolling prairie, from the edge of the high land, a small lake of good water is passed, lying in a narrow valley. Two miles further, over a broken surface, reaches the summit of the Coteau.

From the summit to Crow creek, fourteen miles, the road passes over gently undulating prairie, with occasional mounds from twenty to sixty feet in height, and three miles over broken and hilly ground.

In this distance the dry bed of a branch of Crow creek is crossed, which seldom contains water; when it does not none is obtained after leaving the small lake near the edge of the Coteau until reaching "Crow" creek, nineteen miles. This is the longest portion of the route between Fort Ridgeley and the Missouri river in which water is not found.

As soon as Crow creek is reached it is crossed to the north side, where good water and grazing is found, but no wood. Three and a half miles further another crossing of the same creek is made through a valley one mile wide. Immediately after heavy rains this valley becomes quite soft, wheels cutting through the light soil three or four inches thick, overlying sand and gravel; a few hours of warm sun, however, renders the surface perfectly hard.

There is scarcely any vegetation in this valley. The grasses hardly show themselves. Different varieties of cactus only seem to have a healthy growth.

Four miles down the valley of Crow creek, elm, willow, and oak begin to line the banks and cover the peninsulas formed by the bends of the creek.

This timber increases in size and quantity until reaching the Missouri rive at the mouth of the creek, when oak and ash become the prevailing timber.

On the south side near the creek, the country is somewhat broken, while further back it becomes gently undulating.

For eight miles the road continues on the undulating surface nearly parallel with the stream. Thence three miles to one of the tributaries of Crow creek, where good wood, water, and grass are found in abundance.

Neither in its branches nor in Crow creek is there running water, except in rainy seasons.

The soil of Crow creek is for the most part of first rate quality, while that of the high praries is second rate, with here and there favorable exceptions. From the south branch of Crow creek this road suddenly rises to the high level Coteau, which continues eleven miles to Beaver creek.

The road crosses this creek five miles from its mouth over an old beaver dam; wood, water, and good grass are to be found in any portion of the valley of this creek.

For nine miles further the road continues over a high, level coteau, where a gradual descent of from eighty to one hundred feet to the mile for five miles reaches to the banks of the Missouri river, the western terminus of the road as completed this season.

In conclusion of my report, I have only to say that the route selected and the road as built is, in my opinion, the only one that combines the essentials of wood, water, and grazing the whole length. Any deviation to the south would have thrown the road beyond the sources of the tributaries emptying into the Crow creek and James river streams. It has also been a constant study to carry the road in as direct a line as possible, keeping in view its ultimate adaptability for the route of the "Pacific Railroad." At the terminus of the road there are dense forests of good timber, and the land along the entire route is such as will invite the early attention of the emigrant.

Very respectfully, your obedient servant,

SAM. A. MEDARY,
Engineer.

Colonel WM. H. NOBLES,
Superintendent Fort Ridgeley and South Pass Wagon Road.

Field notes of the location of the Fort Ridgeley and South Pass wagon road from the Missouri river to Fort Ridgeley, Sam. A. Medary, engineer.

Stations.	Courses.	Whole number of revolutions.	Difference in revolutions.	Difference in miles.	Whole number of miles.	Remarks.
	Degrees.					
0	N. 73 E.	114	114	.296	.296	
1	N. 53? E.	213	99	.258	.554	
2	N. 31 E.	496	283	.736	1.290	
3	N. 46? E.	875	379	.985	2.275	High bluffs overlooking Missouri river; country rolling
4	N. 6 E.	1,159	284	.739	3.014	Ravine to the Missouri
5	N. 70 E.	1,540	381	.991	4.005	
6	N. 49 E.	2,555	1,105	2.639	6.644	
7	N. 30 E.	3,426	871	2.266	8.910	
8	N. 14 E.	4,105	739	1.922	10.832	Country level.
9	N. 6? E	4,436	271	.705	11.537	Do.
10	N. 8 W.	4,805	369	.959	12.496	
11	North....	5,011	206	.536	13.032	
12	N. 10 E	5,404	393	1.022	14.054	Descent to the valley of Beaver Dam creek; course west to the Missouri, and distant 4 miles. Good wood, water, and grass. Day's travel, 14.054 miles. Erected 60 mounds. Sept. 1, 1857.
13	N. 5 E.	5,023	219	.570	14.624	Ascent from the valley to high prairie.
14	N. 14 W.	5,934	311	.809	15.433	Country level, and range of ravines to the left.
15	N. 19 E.	6,843	909	2.364	17.797	Country level to bluffs overlooking Fort Lookout.
16	N. 16? E.	7,101	258	.671	18.468	Country rolling.
17	N. 15 E.	7,523	422	1.097	19.505	Summit of coteau between Beaver creek and Crow creek.
18	N. 22 E.	7,755	232	.604	20.169	Rolling prairie.
19	N. 72 E.	7,780	25	.065	20.234	Do.

FIELD NOTES—Continued.

Stations.	Courses.	Whole number of revolutions.	Difference in revolutions.	Difference in miles.	Whole number of miles.	Remarks.
	Degrees.					
20	N. 76 E.	7,970	190	.194	20.728	Deep ravine.
21	N. 27 E.	8.206	236	.614	21.342	Summit of coteau, &c.
22	N. 5 E.	8.518	312	.811	22,153	Commence descent to Crow creek.
23	N. 8 E.	8,946	42-	1.113	23.266	
24	N. 22? E.	9,135	189	.492	23.758	
25	N. 7 W.	9,665	530	1.378	25.136	Sept. 2.—Camped on Crow creek. Good wood, water, and grass. Day's travel, 11.082 miles. Erected 33 mounds.
26	N. 15 E.	9,806	201	.523	25.059	
27	N. 35 E.	10,810	944	2.455	28.114	
28	N. 9 E.	10,987	177	.460	28.574	
29	N. 9 W.	11,077	90	.234	28.808	Descent of bluffs to Crow creek.
30	N. 15 W.	11,105	88	.229	29.037	
31	N. 10 E.	11,270	105	.273	29.310	Camp on south side Crow creek; two creeks emptying into creek on opposite side; well wooded; good timber on this creek to its mouth. Day's travel, 4.174 miles. Erected 19 mounds. Sept. 3.—Retraced line to Station 27 for higher ground; the valley of the creek being soft land.
28	N. 81 E.	11,787	660	2.541	30.655	
29	N. 81 E.	11,911	124	.322	30.977	Country level.
30	N. 76 E.	12,992	1,081	2.812	33.789	Low prairie.
31	N. 56 E.	13,200	208	.541	34.330	
32	N. 52 E.	13,040	440	1.144	35.474	Cross valley of Crow creek.
33	N. 26 E.	13,921	281	.731	36.205	Quantities of cactus, and a large prairie dog village.
34	N. 31 E.	14,394	473	1.230	37.435	
35	N. 45 E.	14,045	251	.653	38.088	Descent into valley leading to Crow creek.
36	N. 62 E.	14,818	173	.450	38.538	
37	East......	14,925	107	.278	38.816	Camped Sept. 4.—Water and grass. Distance, 10.24? miles; 52 mounds.
38	N. 78 E.	15,132	192	.499	39.355	
39	N. 80? E.	15,232	100	.260	39.615	
40	S. 87 E.	15,296	64	.166	39.781	
41	East......	15,411	115	.299	40.080	Country rolling.
42	N. 57 E.	15,416	55	.043	40.223	
43	N. 46 E.	15,647	181	.471	40.694	
44	N. 28 E	15,731	84	.218	40.912	
45	N. 4 W.	15,860	129	.336	41.248	
46	N. 61? E.	16,373	513	1.334	42.582	Country level.
47	N. 50 E.	17,095	1,322	3.438	46.020	
48	N. 62 E.	18,364	669	1.740	47.760	Large stone mound.
49	N. 62 E.	20,896	2,532	6.585	54.345	
50	S. 9 E.	21,101	205	.010	55.035	
51	N. 28 E.	21,361	200	.520	55.555	Small lake, Sept 5.
52	N. 50 E.	21,676	315	.819	56.374	Same.—Distance, 17.588 miles; 78 mounds; 2 miles beyond, good water, wood, and grass.
53	N. 14 E.	21,790	114	.297	56.671	September 6th.
54	N. 58 E.	21,898	108	.280	56.951	Country rolling.

FIELD NOTES—Continued.

Stations.	Courses.	Whole number of revolutions.	Difference in revolutions.	Difference in miles.	Whole number of revolutions.	Remarks.
	Degrees.					
55	N. 73 E.	22,104	206	.536	57.489	
56	S. 82 E.	22,264	160	.417	51.904	Top of bluffs.
57	N. 55 E.	22,333	69	.177	58.083	Sept. 6.—Camped at foot of bluffs. Good wood and spring. Easy ascent to summit. Distance, 1.709 mile. Mounds, 22.
58	N. 55 E.	22,430	97	.252	58.335	
59	N. 45 E.	22,696	266	.692	59.027	Foot of slope of the bluffs.
60	N. 60 E.	22,935	239	.622	59.649	Ascent to coteau of the James.
61	N. 58 E.	23,783	848	2.205	61.854	Level prairie.
62	N. 63 E	24,185	402	6.045	62.899	
63	N. 71 E	25,154	969	2.521	65.420	Small shallow lake to-night.
64	N. 70 E.	25,635	481	1.251	66.671	
65	N. 70 E.	26,612	977	2.541	69.212	
66	N. 65 E.	27,515	903	2.348	71.560	
67	N. 62 E.	28,077	562	1.462	73.022	
68	N. 75 E.	29,084	1,007	2.619	75.641	Crossing of Sand Hill creek.
69	N. 75 E	30,665	1,581	4.112	79.753	Rolling prairie.
70	N. 65 E.	31,064	399	1.037	80.790	Top of bluff of James river.
71	N. 25 E.	31,127	63	.164	80.954	Foot of bluffs, and high-water mark of the James.
72	N. 74 E.	31,240	113	.284	81.248	Camp on James river; 82 feet wide; from tops of banks, 123 feet. Distance, 23 miles. Mounds, 98. Sept. 8, 1857.
73	N. 48? E.	31,355	115	.299	81.547	Camp on east bank, Sept. 14.
74	N. 24 E.	31,443	88	.229	81.776	Top of bluffs.
75	N. 39 E.	31,661	218	.567	82.343	Rolling prairie and marshes now dry.
76	N. 62 E.	31,913	252	.655	82.998	
77	N. 70 E.	32,617	704	1.831	84.829	
78	N. 71? E.	36,957	4,340	11.288	96.117	High level prairie.
79	S. 68 E.	37,110	143	.372	96.489	Crossed Morse's creek.
80	N. 68 E.	37,534	434	1.128	96.617	
81	N. 71? E.	38,063	529	1.376	98.993	
82	N. 77 E.	38,632	569	1.480	100.473	September 14.—Camped on Wolfe creek, 15 feet wide; good grass and water. Distance 18.926 miles; 80 mounds.
83	N. 70 E	38,740	108	.281	100.754	
84	N. 66 E.	39,086	346	.900	101.654	Country level.
85	N. 65 E.	40,379	1,293	3.362	105.016	
86	N. 76 E.	42,059	1,680	4.370	109.386	
87	N. 77? E.	42,755	696	1.810	111.196	Lake Thompson to the left.
88	N. 81 E.	43,063	308	.801	111.997	
89	N. 68 E.	43,195	132	.343	112.340	
90	S. 83 E.	43,142	217	.565	112.905	
91	N. 49 E.	43,591	179	.465	113.370	Crossed inlet of Lake Thompson.
92	N. 77 E.	43,712	121	.315	113.685	Rolling country.
93	N. 75 E.	43,976	264	.686	114.371	Do.
94	S. 80 E.	44,013	37	.097	114.468	Rolling; small country lake.
95	S. 64 E.	44,320	307	.798	115.266	
96	S. 78 E.	44,738	418	1.087	116.353	Marshy land.
97	N. 75 E.	45,040	302	.785	117.138	

FIELD NOTES—Continued.

Station.	Courses.	Whole number of revolutions.	Difference in revolutions.	Difference in miles.	Whole number of miles.	Remarks.
	Degrees.					
98	N. 66? E.	45,376	336	.875	118.013	Indian fortifications, and small lake.
99	N. 76? E.	45,925	549	1.427	119.440	Camped on Lizard lake; no wood; w ter bad. Distance 18.967 miles; mounds. September 15.
100	S. 86 E.	46,113	188	.489	119.029	
100	N. 79 E.	46,151	38	.100	120.029	
101	N. 66 E.	46,237	86	.223	120.252	
102	N. 58? E.	46,426	189	.491	120.743	
103	N. 69 E.	46,509	83	.216	120.959	Country undulating and filled with lakes.
104	N. 79 E.	46,663	154	.401	121.360	
105	N. 80 E.	46,994	331	.861	122.221	
106	N. 68? E.	47,238	244	.634	122.855	
107	N. 75 E.	47,533	295	.768	123.623	
108	N. 74 E.	47,842	309	.803	124.426	
109	N. 71? E.	48,501	659	1.714	126.140	
110	N. 82? E.	48,846	345	.897	127.037	
111	N. 82 E.	49,390	544	1.415	128.452	One mile north lake with timber.
112	S. 83 E.	49,531	141	.366	128.818	Small lake to night.
113	N. 79 E.	49,695	164	.427	129.245	
114	N. 84? E.	50,287	592	1.540	130.785	Level country.
115	S. 88 E.	50,428	141	.366	131.151	
116	N. 81 E.	50,821	393	1.023	132.174	
117	N. 69? E.	51,267	446	1.160	133.334	
118	N. 54 E.	51,370	103	.267	133.601	
119	N. 52 E	51,513	143	.372	133.973	Willow lake.
120	N. 70 E.	51,735	222	.577	134.550	Small lake.
121	N. 80 E.	51,905	170	.442	134.992	
122	N. 76 E.	52,355	450	1.170	136.163	Small lakes.
123	S. 77? E.	52,555	200	.520	136.683	
124	N. 82 E.	52,837	282	.734	137.417	
125	East.	53,070	233	.606	138.023	
126	S. 70 E.	53,145	75	.195	138.218	Camped on Perrine creek; good wat grass, and wood. Distance 18. miles; 125 mounds. September 16.
127	S. 70 E.	53,190	45	.117	138.335	
128	N. 50? E.	53,561	371	.905	139.300	
129	N. 60 E.	53,794	233	.606	139.906	Crossed small stream.
131	N. 44 E.	54,010	216	.561	140.468	
132	N. 47 E.	54,162	152	.395	140.863	Small lake.
133	N. 45 E.	54,321	159	.414	141.277	
134	N. 47 E.	54,610	290	.752	142.029	
135	N. 69 E.	55,344	734	1.908	143.937	September 17.—Camped on west bank Big Sioux river, 63 feet wide; wood, water, and grass. Distance miles; 20 mounds.
136	N. 69 E.	55,359	5	.039	143.976	Crossing of the Sioux.
137	N. 51 E.	55,743	384	.999	144.975	Bottom between Sioux and Medary cre
138	N. 61 E.	56,014	271	.705	145.680	Bottom of Medary creek.
139	N. 58 E.	56,519	505	1.313	146.993	High prairie.
140	N. 49 E.	56,783	264	.687	147.680	Do.
141	N. 57 E.	57,101	318	.827	148.507	Do.

FIELD NOTES—Continued.

Station.	Courses.	Whole number of revolutions.	Difference in revolutions.	Difference in miles.	Whole number of miles.	Remarks.
	Degrees.					
142	N. 62 E.	57,309	208	.540	149.047	High prairie.
143	N. 66 E.	58,250	941	2.448	151.495	Do.
144	N. 83 E.	58,990	740	1.925	153.420	Do.
145	N. 88 E	59,194	204	.530	153.950	Do.
146	N. 80 E	59,370	176	.453	154.408	Do.
147	N. 76 E.	59,740	370	.962	155.370	Do.
148	N. 79 E.	59,960	220	.570	155.942	Do.
149	N. 66 ? E.	60,126	166	.432	156.374	Do.
150	N. 77 ? E.	60,445	319	.830	157.240	Do.
151	N. 67 E.	61,173	728	1.895	159.099	
152	N. 53 ? E.	61,676	503	1.307	160.406	Watering place, branch of Medary creek.
153	N. 62 ? E.	61,870	194	.504	160.901	
154	N. 69 ? E	62,655	785	2.042	162.952	
155	S. 82 E.	62,758	103	.268	163.220	Crossing of small creek running south-westerly.
156	N. 81 E.	63,189	431	1.121	164.341	
157	N. 71 ? E.	63,463	274	.712	165.053	
158	N. 70 ? E.	63,652	189	.491	165.544	
159	N. 51 E.	63,895	243	.632	166.176	
160	N. 59 E.	64,143	248	.645	166.821	
161	N. 66 E.	64,400	257	.669	167.490	Camp at "Hole-in-the-Mountain';" good wood, water, and grass. Distance 23.553 miles; 100 mounds. Sept. 19.
162	N. 51 E.	64,520	120	.312	167.802	
163	N. 52 ? E.	64,598	78	.202	168.004	Descent of the mountain pass.
164	S. 87 E.	64,713	115	.299	168.303	Crossing the mountain pass.
165	N. 58 E.	64,900	187	.487	168.790	
166	N. 78 E	65,043	143	.372	169.162	Hills.
167	S. 81 E.	65,184	141	.367	169.529	
168	N. 76 E.	65,526	342	.889	170.418	Small creek leading to Lake Benton.
169	N. 81 E.	65,966	440	1.144	171.562	
170	N. 77 E.	66,581	615	1.599	173.161	
171	S. 83 E.	66,706	125	.326	173.487	Marsh to the left.
172	N. 60 E.	66,849	143	.372	172.859	
173	N. 51 W.	66,960	111	.289	174.148	Indian village Grizzly.
174	N. 23 E.	67,231	371	.965	175.113	Bear's pound.
175	N. 51 E.	62,703	372	.967	176.080	Fine growth of oak timber.
176	N. 85 ? E	68,172	469	1.220	177.300	Lakes on both sides.
177	N. 55 E.	68,390	218	.567	177.687	
178	N. 44 E.	68,664	274	.713	178.580	North is Cottonwood lake.
179	N. 38 ? E.	68,867	203	.528	179.108	
180	N. 43 E.	69,205	338	.879	179.987	
181	N. 56 E	70,270	1,065	2.769	182.756	
182	N. 72 ? E.	70,400	130	.338	183.094	
183	N. 25 ? E	70,663	263	.685	183.779	
184	N. 44 ? E.	70,890	227	.590	184.369	Lake, with timber; three lakes to the right.
185	East	71,016	126	.328	184.697	
186	S. 66 ? E.	71,366	350	.910	185.607	
187	East......	71,964	598	1.555	187.662	
188	N. 21 ? N.	72,157	193	.502	187.664	Crossing of Redwood river, and camped on east bank; wood, water, and grass in abundance. Distance, 20.174 miles.

FIELD NOTES—Continued.

Station.	Courses.	Whole number of revolutions	Difference in revolutions	Difference in miles.	Whole number of miles.	Remarks.
	Degrees.					
189	S. 76 E.	72,403	246	.640	188.304	
190	East	72,582	179	.465	188.769	Marshy lands and lakes.
191	N. 89E.	72,835	253	.685	189.427	Lakes, with timber.
192	S. 88? E.	73,000	165	.429	189.856	
193	S. 72 E.	73,265	265	.690	190.546	
194	S. 60 E.	73,384	119	.309	190.855	Lakes near the line, to left.
195	S 54? E.	73,471	87	.227	191.082	Rolling country.
196	East	73,661	190	.494	191.576	Do.
197	N. 88? E.	74,022	361	.939	192.515	Do.
198	N. 68? E.	74,319	297	.772	193.287	Do.
199	N. 83? E.	74,440	121	.315	193.602	Do.
200	N. 63? E.	75,016	576	1.498	195.100	Creek, head of Cottonwood.
201	N. 77 E.	75,203	187	.487	195.587	Do. do.
202	S. 66? E.	75,360	157	.408	195.995	Country rolling and small grassy lakes.
203	S. 76? E.	75,504	144	.374	196.369	
204	S. 88? E.	75,716	212	.551	196.290	Do. do.
205	S. 82 E.	75,782	66	.172	197.092	
206	N. 76? E.	76,230	448	1.165	198.257	Do. do.
207	N. 74 E	76,466	236	.614	198.871	Do. do.
208	N. 64 E.	76,529	63	.164	199.035	
209	S. 80 E.	76,779	250	.650	199.688	Crossing Cottonwood river; camp at Big Wood of the Cottonwood; fine timber, water, and grass. Distance, 12.124 miles. September 22.
210	N. 85 E.	77,027	248	.145	200.330	
211	East	77,988	961	2.499	202.829	
212	N. 80 E.	83,912	5,924	15.407	218.231	This course crosses three good watering places and Plum creek, a branch of the Cottonwood; camp at lower crossing of Cottonwood river. Distance, 18.5[illegible] miles.
213	N. 86 E.	84,027	115	.299	218.535	Rolling country, with lakes and marshes.
214	S. 84 E.	84,406	379	.986	219.521	Do. do.
215	S. 83 E.	85,107	701	1.823	221.344	Do. do.
216	N. 62? E.	86,043	936	2.435	223.779	Do. do.
217	N. 71? E.	86,669	626	1.628	225.407	Small creek.
218	N. 68? E.	87,393	724	1.883	227.290	
219	N. 77 E.	87,640	247	.642	227.932	
220	N. 49 E.	87,805	165	.429	228.363	
221	N. 59 E.	88,291	486	1.264	229.625	
222	N. 62 E.	88,827	536	1.394	231.019	
223	N. 56 E.	89,475	648	1.685	232.704	
224	N. 69 E.	90,127	652	1.696	234.400	
225	N. 16? E.	90,306	179	.466	234.866	
226	N. 53 E.	90,780	474	1.232	236.098	
227	N. 56? E.	91,390	610	1.587	237.685	Crossing of north of Cottonwood river; water and grass. Distance, 19.446 miles.
228	S. 48 E.	91,504	114	.216	237.981	
229	N. 72 E.	92,206	702	1.826	239.807	
230	N. 69 E.	92,659	453	1.178	240.985	Intersection of government trail from Fort Randall to Fort Ridgeley, via Sioux agency.

FIELD NOTES—Continued.

Station.	Courses.	Whole number of revolutions.	Difference in revolutions.	Difference in miles.	Wholen umber of miles.	Remarks.
	Degrees.					
31	N. 84 E.	93,238	579	1. 506	241. 491	
32	N. 49 E.	94,119	881	2. 291	243. 782	
33	N. 46 E.	95,020	901	2. 344	246. 126	
34	N. 20? E.	95,377	357	. 928	247. 054	
35	N. 39? E.	95,740	363	. 943	247. 997	Grassy lakes and marshes extending to Redwood river.
36	N. 13 E.	96,651	911	2. 369	250. 366	
37	N. 16? E.	97,229	578	1. 503	251. 869	
38	N. 5? E.	97,891	662	1. 722	253. 591	
39	N. 19 E.	97,991	100	. 260	253. 851	Top of bluff of Minnesota river; descent 150 feet.
40	N. 34 E	98,291	300	. 780	254. 631	Bottom bordering on the Minnesota river, with heavy timber; course ends at Fort Ridgeley rope ferry; river is 150 feet wide, with good banks.
41	N. 30 E.	98,471	180	. 466	254,797	To Fort Ridgeley and intersection of government road to Fort Snelling *via* Traverse de Sioux and Shakapee. Total distance from Fort Ridgeley to Missouri river, 254. 797 miles.

Preliminary report of F. W. Lander, chief engineer, upon his expl rations west of the South Pass, for a suitable location for the Fo Kearney, South Pass, and Honey Lake wagon road. Wm. M. F Magraw, superintendent. Constructed under the direction of the De partment of the Interior, 1857.

WASHINGTON, *November* 30, 1857.

SIR: The instructions of the department to the superintendent, and through him to the chief engineer, directed the construction of a wagon road from Fort Kearny to City Rocks on the shortest practicable route.

The word "practicable" was here susceptible of many definitions. The road to be built was for the benefit of the overland emigration.

In interpreting and following what I considered to be the letter of the instructions, I was guided by the following conclusions, viz:

A large sum of money had been appropriated to build a practicable wagon road over a route where a practicable wagon road had existed for the last ten years. Want of grass, danger of loss of stock by deleterious and poisonous waters, extreme tolls levied at the traders' bridges, and the circuitous route pursued, were difficulties to be overcome or obviated

But the law of Congress and the instructions of the department might also be interpreted as directing that a new road was to be built rather than that an old road was to be improved.

A route has therefore been sought over the more difficult portions of the division, which would—

First. Avoid the alkaline plains of the desert of the Big Sandy.

Second. Pass across Green river at a point above the depth of water requiring ferriage.

Third. Throughout the length avoid bridge-crossings and be abundantly furnished with excellent grass and fuel. It was also important to find minor routes and cut-off lines, which, by the expenditure of small sums of money, could be made of practicable passage for wagon trains, that the emigration might be divided and suffer less from want of pasturage.

For these purposes the whole country between the South Pass and City Rocks was explored, surveyed and mapped, and the result is that the route of emigration may actually be shortened seven days' travel in a distance of five hundred miles, the map lettered for explanation is herewith transmitted.

A preliminary reconnaissance, made during the month of June by he chief engineer, has established the fact that several days' travel can be saved upon the rear division between Fort Kearney and the South Pass. The emigration can also be divided on this division, much sandy road avoided, and many of the traders' bridges rendered free by the expenditure of the sum of $40,000.

H. K. Nichols, first assistant engineer, was instructed to furnish the reconnaissances of the rear division, and as he failed to do so, they are now under progress of completion in charge of Assistant Engineer Jno. F. Mullowny.

From the non-arrival of the building train at the South Pass, the completion of any portion of the work laid out must be deferred to another season.

The line A upon the accompanying sketch is a northern route from the South Pass to City Rocks by way of Fort Hall. It is better adapted for the passage of the ox-team emigration to the Pacific than any other line west of the South Pass, as there are no poisonous waters upon it, nor any ferries or expensive bridges required. It is well wooded and timbered throughout its length, and the great grassed valley of the Pines, which it bisects, is a halting ground, the advantages of which to this class of emigration, after a passage of the eastern sand plains, cannot be over-estimated. A preferable line to the main northern route may be found through McDougal's Gap, (see sketch ;) but this line cannot be graded within the limits of the present appropriation, much of which has been expended.

Choice could be made by the department between the northern route (A, as designated upon the sketch) and the extreme southern line, B. The latter, which passes through the upper Mormon settlements, is of important character, and the shortest yet discovered by the season's explorations. Had difficulties not occurred with the Mormon population, this road could have been very cheaply and rapidly graded by the aid of the labor of Utah Territory. It is neither well wooded nor abundantly grassed, but it is a direct route of easy slopes from the South Pass to City Rocks.

The intermediate routes or connexion lines designated upon the sketch should be laid open for travel.

The principal of these is the Wind River mountains line, (marked X,) which should receive the especial attention of the department. The facilities afforded by this route when graded will repay the country the whole amount appropriated by Congress for the wagon road.

Mr. John Hockaday, an experienced mountaineer, discovered in 1854 a cut-off route across the Bear River mountains, over which he attempted to turn the emigration, and he erected a bridge for the purpose of aiding the adoption of the line.

For light trains this route is decidedly preferable to the old travelled road, and may be so improved as to serve the important purpose of dividing the travel and preventing the present great loss of stock from want of grass.

The wagon road expedition, consisting of a full equipment of tools, wagons, &c., now encamped on Wind river, can grade the Wind River mountain line, which avoids the Big Sandy desert and the ferries of Green river, and open the Hockaday's cut-off to travel, and the bridge can be purchased within the limits of that portion of the appropriation which I have been informed is set apart for the building of the eastern division. No wagon has ever been taken through the Bear River mountains north of Hockaday's cut-off.

An eighty pound measuring vehicle, taken apart and packed on mules, was carried over the most practicable northern pass by the advance party of engineers of the wagon road expedition.

The statement in reference to the improvement of Hockaday's cut-off is made in apprehension of the loss of the mules of the main expedition.

If they are successfully wintered, the northern route, A, or the southern route, B, at the option of the department, can be built, many of the connexion lines opened, and the rear division of the South Pass to Fort Kearney materially improved within the limits of the appropriation.

In the last instance, it is proposed that the work is to be done during the summer of 1859, and after the division from the South Pass to City Rocks is completed the bridges of the rear division to be rendered free by the proceeds of the sale of the stock of the expedition when the work is over. This proposal to postpone the purchase of the traders' bridges until 1859 must be qualified by the presumption of the fact that the present tolls will be an exorbitant tax on government transportation during 1858, if large military operations are carried on in Utah Territory.

The arrival of Assistant Engineer Mullowny will bring intelligence of a new route, by which it is proposed to avoid the bridge over the north fork of the Platte. The price of fifteen thousand dollars ($15,000) is asked for this bridge by the owner, and the passage of it yearly costs the emigration from four to ten thousand dollars. The bridge is offered for sale in apprehension of the building of a free bridge by the wagon road expedition. The owner, Mr. John Richard, is a reliable mountain trader. He proposes either to give bonds to keep the bridge in good repair for six years, and to renew it if destroyed within that time, or to receive only a sixth part of the purchase money yearly. The same arrangement could undoubtedly be made in relation to the bridge at Laramie. In view of the large military operations now going on in the country, the War Department might properly join their funds with those of the wagon road in the purchase of the Richard bridge.

OTHER RESULTS OF EXPLORATION.

Fabulous accounts existing of a desert which extends between the Big Sandy and Green rivers, it was determined to examine it. The first passage across it was made by the chief engineer. It was afterwards thoroughly explored by B. F. Ficklin.

This desert is nearly destitute of herbage, the wild sage or artemisia lining a few depressions of the surface, and grass being found only in the great cañons which extend from the centre of the desert to Green river. These cañons are water drains during the early spring months.

There are several springs upon the desert, which become dry towards the close of the emigration. These may be made of service at low cost, and by artificial means other copious supplies of water may be procured. Were such a result required, the headwaters of the Big Sandy could even be delivered through the centre of the desert plain, and the whole surface might be irrigated from the mountain tributaries of the New Forks of the Big Sandy and Green rivers.

As excellent lines are found which avoid the desert, such extensive operations are not required for the construction of new and direct wagon roads.

The great upper valley of Green river and of the New Forks, its principal tributary, has been surveyed and mapped. This well timbered and abundantly grassed region is undoubtedly suited to agricultural purposes, and is one of the immense herding grounds of the Shoshonee tribe of Indians.

The first Wahsatch, or Bear River, mountain range divides John Gray's river, a main tributary of Lewis' Fork of the Columbia, from Green River valley.

Through several low passes in the more northern chain passage may be made to the headwaters of the Snake or to Wind river, the principal tributary of the Yellowstone. Passing in a westerly direction, the second Wahsatch range and main divide, separating the waters of the John Gray from the Salt river, is encountered. Both of these rivers are large tributaries of Lewis' Fork. Further westward a third range is encountered, dividing the waters of Salt river from the head of the Blackfoot Fork, and a fourth lower and more broken range of mountains is crossed near the open valley of Bear river.

Tracing the tributaries of the Snake to their sources, it may be seen upon the sketch that they all rise in a higher divide than any crossed by a direct western line from the South Pass, and that a mountain chain, from which run out the spurs of the northern system, breaks down towards the south into lines of country which divide the waters of Green river from its tributaries, the Labarge and Fontenelle, and present the junction of Smith's, Thomas', and Solos forks of Bear river.

All the last named streams take rise near the corresponding sources of the waters of Lewis' Fork. The main chain to which I have referred, extending east and west, is at too great an elevation to permit practicable wagon routes over it, and the engineering study of the country developed the necessity of a passage of the great side ranges by the location already described and designated upon the map.

Passing south, the country soon becomes a broken region, covered with sage or with a scanty pasturage on the water courses. In the north, on the contrary, the whole space is well wooded, fertile, and abundantly grassed. A detour north serves location regarding grade, and near the head of Green river by inconsiderable deflection a very level route may be found, which, from the South Pass to the valley of the Great Snake and Bear rivers and to the plains of the Great Basin, presents no obstruction to the favorable passage of railroads. It has been thought expedient to lay out the wagon road further south than this extreme northern line, which would head the great valley of the Upper Colorado.

All the railroad routes designated upon the sketch have been examined and statistics gained of their character. They are very favorable passages of the grand Wahsatch mountain chain, and principal divide of the American continent near latitude 42°.

They are well timbered, and abundantly supplied with pure water and excellent building stone. Beds of coal, iron, and salt, and a spring of peculiar mineral oil, which, by chemical process, may be made suitable for lubricating machinery, are found in their vicinity. In the opinion of the undersigned, the most objectionable of these routes is preferable to any hitherto explored near the 42d parallel.

Beyond the field of examination embraced in the programme of your instructions of ———, the following results may be offered, as gained by side reconnaissance:

A wagon route can be opened from the Devil's Gate (so called,) north of the entire Wind River mountain chain, and passing to Fort Hall by the upper waters of Snake river. It would extend through the excellent watering grounds of Wind river, and when graded, which could undoubtedly be done during one season, would afford the base of a system of military operations from the eastern frontier to Oregon and California, with an open and easily protected line towards the supply grounds of the Beaver Head and St. Mary's valleys.

It cannot be approached from the south save by a few passes, and these may be easily defended by a small body of men; whereas the present line of the old road must be protected by large forces of mounted rangers, the animals of which will eat off the grass of the route and embarrass the emigration.

The whole great influx of the northern population to the Pacific must for the present cease, unless some decided steps are taken during early winter for its protection. It may seem expedient, in view of the unforeseen contingency of Mormon hostilities, to amend the law of Congress directing the construction of the wagon road through the South Pass, or, by further appropriation, provide for the exploration and construction of the more northern line.

The geological resources of the whole region are of extraordinary character.

The following synopsis is a deduction from the results of exploration:

Work on the Wind River mountain route.—1,000 days' labor in Sweetwater and Big Sandy cañons; bridge or submerged platform and dressed fords at Green river and New Forks, if deemed expedient for mail service during spring freshets; whole cost of work to turn off Hockaday's Cut-off and old road, twenty-five thousand dollars	$25,000
Purchase and repairs of the Hockaday and Dempsey bridge, with sum for rendering free the bridges at Smith's and Thomas' Forks	6,000
Change of line over mountain by zigzags, or detour approach	15,000
	46,000

MAIN NORTHERN ROUTE.

Wind River mountain line, as above	15,000
Cañon approach at head of Piney and descent to valley of Labarge	10,000
Work at Thompson's Pass	20,000
Descent along Smith's Fork	5,000
Work at summit and descent along branch of Salt river	8,000
All other work	12,000
	70,000

MAIN SOUTHERN ROUTE.

Work in cañon of Muddy	$8,000
Bridges at Bear river, upper crossing	8,000
Bridges at head of lake	1,000
Work on gulley at Martin's Pass	4,000
Work in 17 mile cañon, near Cache valley	30,000
Bridges at Bear and Malade rivers	20,000
	71,000

In the event of the suspension of Mormon hostilities, the work on the southern route could be done cheaper by contracts with the Utah population and sale to them of the materials of the expedition on hand than in any other way.

They are the ablest and most efficient managers and working men to be found in the central mountains.

Under the circumstances of the present war the exposure of the bridges and costly works of the long cañon to their molestations would be a serious contingency to encounter.

The cost of protecting these works by a military force cannot properly appear in this estimate. The probable refusal of the emigration to use the road when built has already been alluded to.

All these estimates are guided by apprehension of a decided, energetic, and united course of action on the part of the superintendent and command, and of such discretionary power being conferred on the chief of the expedition as will enable him to practice due economy in expenditure.

The sums named include subsistence for six months, with the transportation of it to Fort Thompson and the use of the government property now at that point.

The usual notes, journals, and scientific data obtained by exploration are in hand, and this preliminary statement, made in view of the directions of the superintendent, and in reply to your letter of November 21, properly precedes a full exposition of the results of the year's labor, and the office-work required for its arrangement.

As your letter of instructions to the superintendent gave me no authority over subsistence and transportation beyond the expression of my desire to obtain it, my departure from the frontier was delayed until the 15th day of June.

The whole work of the advanced corps of engineers was completed in sixty days, for it required thirty days to reach the field of labor.

I cannot close this report, therefore, without expressing my sense of the obligations I am under to the members of the party for their efficient and manly persistence in duties performed during a stress of physical and mental labor not ordinarily required.

I am, sir, with great respect, your obedient servant,

F. W. LANDER,
Chief Engineer, &c., &c.

Report of Superintendent John Kirk upon the western division of the Fort Kearney, South Pass, and Honey Lake wagon road, constructed under the direction of the Department of the Interior, 1857.

SAN FRANCISCO, *January* 4, 1858.

SIR: Upon my arrival in California I immediately set about organizing a party for the purpose of carrying out the designs embraced in your instructions dated May 1, 1857.

More time was required in procuring the necessary outfit than was anticipated, and, with utmost diligence, the expedition was not ready for starting until the 27th of June.

I determined to start with a full complement of men, well knowing that, in crossing the mountains, many would abandon the party and many prove worthless; at the same time more work was supposed to be required on the road than our experience has since proved.

I set out with seventy-eight men, including the officers, five large ox wagons drawn by oxen, two smaller wagons drawn by mules, and a spring wagon for the instruments, also drawn by mules. The number of animals was as follows, viz: 58 oxen, 14 mules, and 8 horses.

The itinerary of the route gives the movements of each day. I proceeded by the most direct route from Placerville, my headquarters, to Honey lake, and from that place to the west bend of the Humboldt river. So far as the road betwen the latter places, in relation to grade or solidity of road-bed, is concerned, it has no superior during the dry season; but, in the winter, the Mud lakes, without proper embankments, must be impassable for wagons.

It will be seen by the itinerary that the grass and water is not uniformly distributed along the route.

The survey of the Humboldt river has amply proved that it is the most direct and best location for a road from Thousand Spring valley to its western bend, a distance of about 250 miles.

The peculiar topography of the country prevents the location of any other route, without great expense, from the Great Bend to Thousand Spring valley. Even then the saving of distance would be small.

The successive mountain ranges that extend from the rim of the Great Basin towards its centre are perforated by this river, thus making a natural and easy road. Nearly the whole length of the stream is a fine, grassy bottom, whose rich alluvian invites the agriculturist and stock-grower, after a proper survey and assurance of protection from the Indians. It is well understood that the principal requirements of our emigrant road to California are water and grass; therefore, for large cattle trains, the occasional springs and patches of bunch grass in the mountains cannot be depended upon.

It is believed that the experience of this season will correct the current opinion in relation to the pernicious qualities of the water of the river and the grass upon its banks.

Except at the lake and its vicinity we found the water good and the grass superior, both in quantity and quality. A little care exercised on the part of the emigrant in keeping his stock from the water standing in occasional sloughs will save him much loss. From the examinations already made it is evident that the greatest difficulty in the road is between the west bend of the Humboldt and California.

Either of the present roads from the river literally cross a desert. It is proposed, then, to avoid this at the expense of distance. The object of the act of Congress seems to require that the approach to California should be over the best passable road, without deviating materially from the general route; hence, the terminus is placed "at or near Honey lake." By leaving the river at Big Meadows, 39¼ miles below Lassen's Meadows, and crossing the broken range to the west over to the south end of Pyramid lake, it is believed that a good road can be got through the mountains.

Mr. Bishop, in his examinations about the end of Pyramid lake, reports that several passes were seen through which a road could be constructed; also, plenty of grass at the south end of the lake and along the Truckee river. From this place the road can connect with the long valley by passing up through the cañon which I examined the 31st day of July.

The distance from the river to Pyramid lake is about 55 miles; from the lake to the State line 35 miles; making 90 miles from the State line to the river. Adding, then, the distance of 39¼ miles up to Lassen's Meadows, makes 129¼ miles against 107 by the way of the Mud lakes, which makes a distance of 22¼ miles in favor of the upper route in distance. The construction of a road over the proposed route would probably be one-third less than the other.

I beg leave to call the attention of the department to the outrages committed by the Indians during the past season on the line of my division. It will be seen that a number of persons have been murdered, much stock driven off, and other property destroyed. It is stated, and to some extent believed, that the whites were the aggressors. Such may be the fact, but, as is almost always the case, innocent persons have been the sufferers.

It is strongly suspected that these excesses were instigated by white persons, but I have no evidence that such is the case.

Military posts should be established, then, for protection of both parties; and unless some measures are taken for the protection of the emigrant, his family, and property, the overland travel by this route will be seriously affected. I would suggest the Stony Point Meadows, on the Humboldt, and the City Rocks or vicinity, as proper locations for posts. Both places are favorable resorts for the Indians; of the advantages of the latter place, other than this, I am not qualified to report. But at the Stony Point Meadow every facility is at hand for their establishment which a country of this kind is likely to afford.

The estimates for the construction of the road will be found in the able report of the engineer.

This, with the itinerary, will furnish, it is believed, the necessary information for which the organization was designed. The economy of my operations will, I trust, compare favorably with others of similar nature.

There has been no attempt at display, nor any extravagance permitted. Upon our arrival at Placerville all the men were discharged, except the engineer corps, and the stock was placed upon a ranche in the Sacramento valley.

I remain, sir, most respectfully, your obedient servant,

JOHN KIRK.

Hon. JACOB THOMPSON,
Secretary of the Interior, Washington, D. C.

FORT KEARNEY, SOUTH PASS, AND HONEY LAKE WAGON ROAD—WESTERN DIVISION.

Report of Francis A. Bishop, engineer, to John Kirk, superintendent.

SAN FRANCISCO, *January* 4, 1858.

SIR: In obedience to your instructions, I have the honor to submit the following report and maps of the survey made under my direction between Honey lake and the City Rocks.

I deem it unnecessary to enter into an elaborate statement of the topographical features, geology, and natural history of the country through which our line runs. The explorations of Colonel Frémont and Lieutenant Beckwith extended over the greater part of the country traversed by our survey, and all the necessary information of that character is furnished by the admirable reports of those gentlemen. After a general description of the country, I shall confine myself to such details as have a direct bearing upon the location of the road.

Beginning near Honey lake, the line of road follows the northern margin of the Great Basin and crosses near its eastern terminus, the dividing ridge separating the waters of the Great Basin from the tributaries of the Columbia river.

The topographical features of the adjacent country, for the whole distance, are nearly the same.

Three great ranges, the West Humboldt, the Humboldt, and the Goose Creek mountains, which converge towards the centre of the Great Basin and in the vicinity of the line—the two former immediately to the south, and the latter crossing it.

Between these principal ranges are numerous smaller ones, many of them isolated, but bear in the same general direction. At their bases are small dry valleys covered with artemisia, or forming white mud bottoms destitute of vegetation.

The Humboldt river, rising in latitude 41° 15′ 30″ north, longitude 114° 51′ 31″ west, flows westerly for a distance of two hundred and forty-seven miles, and, excepting occasional small springs, is the only water in the northern line of the Great Basin.

It is only along this stream that a road can be constructed combining the advantages of distance, grade, natural road, and a plentiful supply of grass and water.

In making the estimates the line has been divided in four divisions: The first extending from the 120th meridian, at Rush valley, to the Lassen's Meadows, on the west bend of the Humboldt river; distance of 107.09 miles. The second extends from Lassen's Meadows to

Gravelly Ford; distance of 132.54 miles. The third extends from Gravelly Ford to the Humboldt Wells, 104.50 miles. The fourth division, from the Humboldt Wells to the City Rocks; distance 92.80 miles. A fifth division has been added, extending from the Lassen's Meadows southwesterly to the west end of Truckee cañon; distance 141.32 miles.

The topographical positions of various camps, in latitude, have been very accurately determined.

The observations were taken by the sextant; but they have been sufficiently multiplied to give satisfactory results, and agree very nearly with the traverse.

In our observations for longitude we have not been so fortunate; Lassen's Meadows is the only place satisfactorily located. The traverse, however, was connected with places in Carson valley, the positions of which had been well determined.

I regret my inability to furnish a profile of the line; my barometers were either broken or worthless previous to my arrival at the initial point, and we are thus deprived of the invaluable information derived from a well conducted set of meteorological observations.

The method of construction called for by the estimates is simple and unpretending. The aim of your engineer is the construction of a good road, carried out on the principles of true economy, but at no time forgetting its purposes or importance. A natural road is to be found nearly the whole distance, and no engineering difficulties are encountered. The courses and distances have been very accurately taken. The location of the road in some places will be subject to the modification of constructing engineer. Mounds have been erected at intervals along the line, but nature has with more permanence marked the route. The system of bridges and culverts is unexpensive, and the quantity of rock excavation small.

At the crossings of the various dry, gravelly ravines which only drain the surface water during the rainy season, the banks will be sloped to a proper grade and no culverts will be required.

The width of the embankment is estimated at 24 feet on the top, with slopes of 1½ horizonal to 1 in altitude. The bridges will be of wood, and the timber will be obtained from the Sierra Nevada and Goose Creek mountains. The culverts will be of stone, and five miles is the average distance of suitable materials from the line. The estimates of each division, after a description of the localities requiring labor, are arranged in a tabular form. The calculations are on the basis that the labor and supplies for the whole work will be drawn from California.

First division.—Commencing at the boundary line between Utah Territory and California as determined by me.

The road passes over a steep, stony hill from Rush Creek valley into Smoke Creek bottom; a bridge 15 feet in length will be required to cross Rush creek. Side grading will be necessary on the hill.

The crossing of Smoke creek, in the valley, requires another bridge 40 feet long. Those in Smoke Creek cañon will not require bridging; the bottom of the stream wide and solid. The cañon itself requires but little work.

Crossing several low ridges, the road descends to the valley of the Mud lakes. No work is necessary until reaching a slough near Deep springs, where some embankment will be needed.

From this place to Granite creek no labor is required. Immediately beyond Granite creek the road crosses Mud lake, where eight miles of embankment four feet high is considered necessary. No finer summer road can be found than this, but in the winter season it is covered with a thin sheet of water.

Between the Hot springs and Rabbit Hole springs the gound is undulating and several ravines cross the road. Both excavation and embankment will be necessary.

From Rabbit Hole springs to Lassen's Meadows the road is generally good, but some excavation will be required at the springs on the hill beyond, and on the dividing ridge two miles west of Antelope springs. A culvert is also required between Antelope springs and the river.

Estimate for the first division.

Locality.	No. of cubic yards.	Cost per yard.	Nature of work.	Amount.
Rush Creek hill	2,847	$0 35	East excavation	$996 45
Slough at Deep springs	500	35	Embankment	175 00
Mud lake	162,704	40	....do	65,081 60
Between Hot and R. H. springs.	8,566	35	Excavation and embankment	2,998 10
Rabbit Hole springs	2,160	35	....do ....do	756 00
Rabbit hill, beyond	4,300	35	....do ....do	1,505 00
Dividing ridge	2,935	35	....do ....do	1,027 25
Rush and Smoke Creek	(2 bridges)	20 00	Per foot—35 feet	700 00
Between Antelope spring and river	(1 culvert)			600 00
Total				73,839 40

Second division.—Commencing at Lassen's Meadows, west bend of the Humboldt river. For 15 miles the ground over which the road passes is broken by dry ravines; the soil is light and friable, and some excavation will be required in the ravines.

Thence to the Big Bend of the Humboldt the road is sandy, and ascends and descends several sandy bluffs. At the bend of the river a bridge 20 feet in length is required to cross a small stream coming in from the north.

Thence to the range of mountains called the Pah Utah and Shoshonees Line no work is required. In crossing this range, though low, some excavation is necessary.

Between this place and Stony Point three culverts will be wanted. The road is level and solid. At Stony Point the road passes over a stony spar; no excavation required. In Stony Point meadows adjacent to the point, the ground is low and a one-half mile of embankment will be necessary.

In crossing the meadows some embankments and three culverts are required. Road to foot of the hill west of Gravelly Ford, solid and of superior quality. In crossing the hill to the river excavation will be required.

Estimate for the second division.

Locality.	No. of cubic yards.	Cost per yard.	Nature of work.	Amount.
To Pah Utah line	7,332	$0 45	Earth excavation	$3,299 40
Do	4,155	45	do	1,869 75
Stony Point	2,400	45	do	6,080 00
Stony Meadows	10,500	45	Embankment	4,725 00
Hill west of Gravelly Ford	9,166	45	Excavation	4,124 70
			Six culverts, at $600	3,600 00
Total				18,698 85

Third division.—Commencing at Gravelly Ford, opposite the ford some rock will require moving. The road ascends the range for about half the distance through a deep ravine in which is more rock; the remainder of the distance over the hill earth excavation.

No bridge is required at Maggies' creek nor at the creek a short distance eastwardly; both are shallow and have a firm bottom. After crossing the plain the road enters Frémont's cañon; some rock is to be moved here.

Thence to the two hills near the north fork of the Humboldt, there is a good solid road; these hills require excavation. No bridge will be required at the north fork of the Humboldt; the banks are low and the bottom solid. At station 681 the line crosses a small branch of the Humboldt; a bridge 50 feet in length and some embankment will be required.

Between the last mentioned point and Humboldt cañon some rock and earth excavation will be necessary.

Estimate for the third division.

Locality.	No. of cubic yards.	Cost per yard.	Nature of work.	Amount.
Hill opposite Gravelly Ford	4,380	$0 55	Earth excavation	$2,409 00
Do do	700	2 50	Rock	1,750 00
Gravelly Ford hill	34,100	55	Earth excavation	18,760 50
Do	650	2 50	Rock	1,625 00
Frémont's cañon	14,131	55	Earth excavation	7,772 05
Do	500	2 50	Rock	1,250 00
Hill near North fork	6,188	55	Earth excavation	3,403 40
At station No. 681	4,420	55	do	2,431 00
Humboldt cañon	1,477	55	do	812 35
Do	200	2 50	Rock	500 00
			Bridge, 50 feet, at $30	1,500 00
Total				42,213 30

Fourth division.—Commencing at the Humboldt Wells.

From this place the road crosses the open plain, and ascends the dividing ridge between the Wells and Thousand Spring valley; road-bed solid; excavating required on this ridge.

Then descending into the valley, and crossing over good ground, it passes into Well Spring valley, thence over the divide to Goose creek; this divide is a large plateau.

The descent to Goose creek is favorable, but some excavation will be required. Instead of following the survey over the ridge again to the creek, the estimate is for a short route, which at present is impassable on account of loose boulders. A small bridge, twenty feet, will be required; after leaving this cañon, a short distance brings us to the line again. Proceeding through the large cañon, which requires but little work, we follow Goose creek down to the foot of the mountains. A bridge will be required to cross a small stream that flows into the creek from the south.

Some excavation required at different places along the creek.

The bulk of the labor on this section is at the Goose Creek mountains; a good grade can be obtained without more than ordinary difficulty. From the summit of the pass to the City Rocks the road descends gently into a wide plain; some little excavation will be required here to pass some small dry ravines. No further work required.

Estimate for the fourth division.

Locality.	No. of cubic yards.	Cost per yard	Nature of work.	Amount.
To Thousand Spring valley	5,870	$0 60	Earth excavation	$3,522 00
From Rock spring to Goose creek	1,375	60	do	825 00
Cañon on Goose creek	2,470	60	do	1,644 00
Along Goose creek	4,420	60	do	2,652 00
Goose Creek mountains	27,400	60	do	16,440 00
Do	1,200	2 50	Rock	3,000 00
Bet. Summit and City Rocks.	1,375	60	Earth excavation	825 00
			2 bridges, 40 feet, at $20.	800 00
Total				29,708 00

Fifth division.—The line of survey has been extended from Lassen's Meadows to Carson's valley for the purpose of testing the longitudes. An estimate is appended from the meadows to the west end of Truckee cañon. The road passes down the Humboldt to the south end of the lake, a distance of 68½ miles.

The ground for a road-bed excellent. A bridge, 100 feet in length, to cross a deep slough 20¼ miles below the meadows, and also some excavation is required at the same place. Thence to the Truckee river the road is good, excepting heavy sand for the last five miles. The cañon, 26¼ miles in length, will require considerable labor; and, to avoid bridges, the road should be carried up the south side of the river.

The quantity of rock excavation, however, is not large. The entire length of this division is 134½ miles.

Estimate for the fifth division.

Locality.	No. of cubic yards.	Cost per yard.	Nature of work.	Amount.
Slough, 20 miles below Lassen's	1,375	$0 35	Earth excavation	$481 25
Bridge, 20 miles below Lassen's			Bridge, 100 feet, at $30.	3,000 00
Truckee cañon	68,333	35	Earth excavation	23,916 55
Do	2,000	2 50	Rock	5,000 00
Total				32,397 80

Summary of cost of construction.

First division	107.09	miles	$73,839 40
Second division	132.54	"	18,698 85
Third division	104.50	"	42,213 30
Fourth division	92.80	"	29,708 00
Total	436.93	"	164,459 55
To the cost of construction add for contingents ten per cent			16,445 95
Superintendence and engineering			7,000 00
Making the total cost			187,905 50

The above estimates are considered ample for the construction of a first rate road. In attempting to avoid the too common error of underestimating the cost of the work, I have been careful not to reach the other extreme.

The locality, transportation of provisions, and materials, have met with a careful consideration, and the sliding scale of prices has been fixed in accordance with the result of these calculations.

I regret my inability to make more side examinations, but the movements of the train were so rapid that my time was entirely occupied in locating the road; and, on our return, the animals were too much disabled for such purposes.

The line of survey commenced at Honey lake, 22.17 miles westerly from the California boundary, which makes the distance from the former place to the City Rocks 459.10 miles. The distance from Lassen's Meadows to Genoa, in Carson's valley, is 175.36 miles.

Specimens of rocks, from along the line, have been collected; also of the soil, along the Humboldt, and the different varieties of grass seeds.

A delineation of the line on a scale of one mile to the inch is given, also a reduced map on a scale of 1. to 360.000 of nature. The latitudes are deduced from observations made by myself; the longitudes, with one exception, are from the traverse. My attempts at chronometric longitudes failed, from the inefficiency of the instrument.

It will be observed that the magnetic variation increases in going from the Honey lake to the City Rocks from 16° 15″ east, to 17° 20″ east—contrary to the general law of magnetic variations. This fact, I believe, has been already noticed, but I have not the authority at hand.

A large amount of information, embracing the minute details connected with the survey, can be found in the field notes which accompany this report.

In connexion with these notes much credit is due my assistants, Messrs. Thomas J. Arnold and Reed Bigler, who were in immediate charge of the line.

Their prompt and efficient services, which on all occasions was cheerfully and promptly rendered, are duly appreciated, and I beg leave to return most sincere thanks.

In closing this report it may not be improper to make a few remarks on the results of our surveys as bearing on the question of the feasibility of the construction of a railroad from the central portion of California to the Great Basin. I am aware that the consideration of this question may be regarded, to a certain extent, as foreign to the immediate objects of our organization. The importance of the construction of a railroad from the waters of the Mississippi to California, and the general attention which is now drawn to the subject, would of itself be sufficient apology for the introduction of any information in regard to it. But it may fairly be presumed that the construction of the wagon road is only preliminary, and designed to assist in the construction of the railroad, and therefore, I trust, the remarks I may make may not be inappropriate.

The surveys we have made anterior to and in connexion with the wagon road explorations have made us familiar with the country between the valley of the Sacramento and the Great Basin; and we are satisfied that an easy and practicable route for a railroad connecting them can be obtained. The proposed line would, on leaving the level plain of the Sacramento valley, follow up and near the south fork of the American river to Slippery Ford; thence piercing the sierras by a tunnel of moderate length, it would enter Bigler Lake valley, and follow its banks and the valley of Truckee river, through which the waters of the lake empty into the Great Basin, until the general level of the basin is attained.

There is good reason to believe that no formidable engineering difficulties will be encountered in carrying a railroad from this point to Salt Lake City, or to such a point south of it as will connect with either Stansbury's or Frémont's route, to the States on the Atlantic western frontier.

From the present terminus of the Sacramento Valley railroad, at Folsom, to Lake valley, the distance by the proposed line of railroad would not vary far from 100 miles, and the elevation is 5,900 feet; thence to Truckee meadows is about 45 miles, and the descent is 1,200 feet.

It is not believed that there will be much difficulty in distributing he ascent of the sierra into nearly uniform grades. The average rise o be overcome is so much within the maximum surmounted by locomotives on many railroads, that the possibility of obtaining practicable grades may be safely admitted.

Snow never falls either at Slippery Ford or at Lake Bigler in sufficient quantities to form any serious obstructions to the use of the road t all seasons.

In descending from Lake Bigler, the line would be carried nearly n a level with the lake until it arrives at its northern extremity, nd the greater part of the whole descent must be distributed in about 25 miles between that point and Truckee meadows, giving a grade of ay 50 feet to the mile. Truckee meadows are properly within the Great Basin, and the reports of the surveys made by order of the United States government all coincide in showing that no serious obstacles exist to crossing it with a railroad thence in the direction, or o the south of Salt Lake City.

In my opinion, fewer difficulties present themselves in the construction of a railroad on the line indicated than have been surmounted n almost every one of the great roads which cross the Apalachian ange.

All of which is most respectfully submitted.

FRANCIS A. BISHOP,
Civil Engineer Fort Kearney, South Pass,
and Honey Lake Road, Western Division.

John Kirk, Esq.,
Superintendent.

Table of geographical positions—latitudes.

Place.	Latitudes.	Remarks.
	° ′ ″	
Camp north end of Honey lake	40 21 16	By sun and Polaris.
Rush valley	40 33 07	By traverse.
Lassen's Meadows	40 41 44	By sun and Polaris.
Big Bend of the Humboldt	41 0 34	By Polaris.
Gravelly Ford	40 34 06	By Polaris.
Mouth of Humboldt cañon	41 12 51	By Polaris.
Humboldt Wells	41 15 30	By traverse.
City Rocks	42 3 15	By meridian alt. sun.
Do	42 2 16	By traverse.
Sink of Humboldt	39 56 15	By Polaris.
Truckee Meadows, west end of Buttes	39 28 34	By Polaris.
Genoa, Carson valley	39 1 10	By Polaris.
Do	39 0 2	California boundary survey.

Table of geographical positions—longitudes.

Place.	Longitudes.	Remarks.
	° ′ ″	
Camp north end of Honey lake	120 17 51	By traverse.
Rush valley	119 59 19	Do.
Lassen's Meadows	118 16 51	By observation.
Do	118 17 30	By traverse.
Big Bend of Humboldt	117 33 02	Do.
Gravelly Ford	116 23 53	Do.
Mouth of Humboldt cañon	115 1 56	Do.
Humboldt Wells	114 51 31	Do.
City Rocks	113 44 33	Do.
Sink of Humboldt	118 42 26	Do.
Truckee Meadows, west end of Buttes	119 44 47	Do.
Genoa, Carson valley	119 49 42	California State boundary survey.

Report of Superintendent F. W. Lander upon the central division of the Fort Kearney, South Pass, and Honey Lake wagon road, constructed under the direction of the Department of the Interior, 1857-'58-'59.

WASHINGTON, D. C., *January* 20, 1859.

SIR: In pursuance of the directions of your letter of December 7, 1858, I have the honor to transmit a report and map of the central division of the Fort Kearney, South Pass, and Honey Lake wagon road.

Very respectfully, your obedient servant,

F. W. LANDER,
Superintendent, &c., &c.

Hon. JACOB THOMPSON,
Secretary of the Interior.

NARRATIVE OF PROGRESS OF EXPEDITION.

Your instructions to organize an expedition at some suitable point on the Missouri river, and to continue the construction of the Fort Kearney, South Pass, and Honey Lake wagon road, were carried out by the selection of Independence, Missouri, as a starting point, where was stored some of the property of last year's expedition.

The expedition left Independence on the 29th day of April. The actual progress of the march commenced at Fort Leavenworth on the th day of May. The expedition was equipped for fast service, and, in addition to the tools and appliances of construction, carried only one hundred days' provisions for the outfit. A contract was made at Fort Leavenworth with S. E. Ward, the sutler of Fort Laramie, for a train of provisions to be delivered at the latter point early in July. Prior to reaching Fort Laramie large numbers of destitute men were met upon the road. They were discharged teamsters and individuals who had left Camp Scott on the opening of spring. As the expedition, with the exception of Colonel Hoffman's, which had started a month earlier, was in advance of all other trains, I was compelled to feed and shelter these destitute and starving men. On reaching Fort Laramie a Mexican train was encountered loaded with flour, kiln-dried meal, and *frijoles*, or Mexican brown beans. The opportunity thus offered of turning to advantage the number of laborers who were destitute and seeking employment along the road, and of carrying the work you intrusted to my charge to more immediate completion, was embraced, by the purchase of the freight of this Mexican train. It was bought at prices much lower than the usual rates of the country, and cheaper than I could myself have brought supplies from the States. Fresh oxen and wagons having been purchased for the purpose of moving these provisions to the mountains, the new train was placed in charge of Mr. B. F. Burche, who was directed to forward it with as much celerity as might seem practicable. These arrangements were all perfected during the one day's halt which the expedition made at Fort Laramie. It arrived at the South

Pass, a distance of 950 miles from the starting point, and the commencement of the work, on the 14th day of June. A block-house was immediately constructed, and the tools and provisions of the advanced train placed in it. The best mules and wagons were then despatched back to Fort Laramie in charge of Alexander Mitchell, who was directed to bring up the remaining portion of the Mexican supplies and the Indian goods transported by Mr. Ward. A smaller party, under the direction of Charles Evans, was sent to Fort Thompson, on Wind River, to collect and bring to the line of the work such tools and appliances of the last year's expedition as might still remain serviceable. John Justus, the wagon-master of the last year's expedition, whom I had been fortunate enough to engage at Fort Laramie, was despatched to Salt Lake City for men to work upon the road. The engineers, with a detached party, commenced their work upon the base line of the route, and upon such reconnaissances and side surveys as the limited amount of transportation which I was enabled to furnish permitted their attempting. On the fourth day after reaching the South Pass, and after concluding these arrangements, I started in advance upon the line of the new road with the small train that remained. The party with me consisted of the lumbermen and bridge builders, hired in the State of Maine, for cutting out the heavy timber upon the line and for erecting such bridges as might be required. I was also accompanied by the employés who had joined the train during its march. The rate of 15 miles per day was kept up from the broad plain of the South Pass to Piney cañon, of the Wahsatch mountains. At Piney cañon the first hard work of the division was encountered. Through this difficult section a narrow road-way only was built, and the first range of the Wahsatch mountains crossed by cutting out the timber which lined the summit of the section to Labarge creek. The party continued its progress up the open valley of Labarge creek and crossed the main or great range of the Wahsatch mountains to Smith's Fork, cutting out the timber, but making only a narrow road-way, arriving at Smith's Fork on the 10th day of August. From Smith's Fork, which is the great tributary of Bear river, it crossed the third mountain range and arrived on Salt river, the principal tributary of the Great Snake River of the North, on the 21st day of August.

During this period the train of Mr. Burche and those of Alexander Mitchell and Charles Evans had arrived. John Justus had also brought to the work 47 employés from Salt Lake City, the latter chiefly Mormons. The engineering party, under the direction of Mr. John Lambert, had fixed with accuracy the position of some of the principal points on the road and completed some important side reconnaissances. Messrs. William H. Wagner, first assistant engineer, and J. C. Campbell, general assistant, had in the last named duty done themselves great credit by the discovery of a route towards the south partially explored by my party of last year, and had also tested the work by an excursion towards the valley of the Snake. A reorganization also took place in the engineering corps, which led to marked efficiency and progress, the conduct of which places me under peculiar obligations to William H. Wagner, R. L. Poor, and Melchior

M. Long. The small road-way broken by the advanced party was widened by placing regular forces of laborers along the line, weekly supplied with provisions from the fort which had been erected in Piney Cañon by Mr. B. F. Burche after his arrival there. From the limited amount of my transportation I was compelled to make a reconnaissance for the location of the road with one companion, a mountaineer named Peter Gabriel, to whom I am much indebted for his self-reliance, determined energy, and courage.

As it was at this time necessary for me to visit Salt Lake City, not only to carry out your instructions regarding the last year's expedition, but also to procure money to pay off employés, as the work approached completion, I left the main working parties of the line in charge of J. C. Campbell, B F. Burche, and William West, and gave to Mr. Wagner the important duty of reconnaissance in advance from the western Wahsatch mountain range, towards the head of Ross' Fork of Snake river. All these gentlemen performed their duties to my entire satisfaction. I was accompanied to Salt Lake City by Mr. John H. Ingle, disbursing clerk, who has been of great service to me during the entire progress of this and last year's expeditions. We returned on the 7th day of September, after a rapid trip, with a pack party of two men, through the unfrequented trails of the Bear river and Malade mountains. During my absence, and while in Salt Lake City, I learned that the western Snake Indians had attacked the mail and stopped emigrant parties in Malade valley, and near Goose creek mountains. As it was necessary to carry the survey of the road to the last named point, and also to pass a portion of the wagon road employés, who at the end of the season had been promised a passage to California or a return to the States, and preferred the former, I now organized a party of five picked men, and accompanied by the engineers, Wagner, Poor, and Long, and Mr. Campbell, went forward to the end of the division, and visited these Indians, and completed the survey and location of the road. On my return, the work of the division being completed, with the exception of such minor details as could be profitably left in charge of Mr. Campbell, and as circumstances directed this course as the most expedient one to pursue, suitable caches were made of tools and appliances, the parties called in, and the expedition prepared for its return to the States. The circumstances which led to the return of the expedition to the States, rather than to the wintering of it in the mountains, are as follows:

The Crow and Shoshonee Indians having broken out into open war in the north, did not permit of my risking or exposing the large stock of mules of the expedition at the camp selected as the wintering ground of last year's expedition, on Wind river. Every point near Salt Lake City suitable for wintering stock had been occupied by Mormons, the army, or by the large trains of transportation contractors. Forage was at such rates and prices at Salt Lake City as to preclude its being purchased for this expedition. All articles of supply not possessed by my own train were held at exorbitant prices. The oxen of the expedition were fat, and could be sold at their original cost. The mules were in such excellent condition as to be able to make a trip to the States without serious loss. The articles of supply needful for the ensuing year could be brought up by the mule train in the spring at mere nominal cost, as compared with the prices demanded by the spring transportation contractors for furnishing them. In addition to these facts, as the road was completed, with the exception of that dressing up necessary after the spring freshets, and before it was trodden by the emigration, there was no reason for remaining in the country. But beyond all this, some of the most excellent employés of the train had been hired at high rates of pay for peculiar services, and engaged under the idea that it would take eighteen months to construct this work, and that they would be furnished transportation home or to California on its completion. I had, therefore, either to keep up their pay and subsistence during the winter, and give them transportation in the spring or to return them to the settlements. My winter provisions were well stored at Fort Laramie, and being within 300 miles of the work would answer for the ensuing summer. In addition to all these reasons, which render the matter conclusive in my own mind, it was absolutely necessary that I should consult you on the subject of Indian difficulties liable to arise from the location and construction of this new road across the herding and camass grounds of the Shoshonee and Pannack tribes. The direction of a portion of the appropriation remaining unexpended for the purpose of obtaining the good will and kindness of these Indians, or the propriety of a new appropriation for the same end, is referred to in that part of my report embraced under the head of "The Indians." Should my views in this respect be adopted by you, and carried out, a portion of the return wagons will absolutely be required for the transportation of presents for these Indians. Under the weight of all these circumstances, and as the amount of work ordered by your instructions had been accomplished, and I had received no further directions from the department, I brought the expedition to the States, and discharged the employés at St. Joseph's, Missouri, on the 17th day of November last. Mr. J. C. Campbell, who remained in charge of the Mormon employés, took with him to Salt Lake City a small amount of transportation, which he has been instructed to dispose of or to winter there, as may seem to him most expedient, and to await your instructions for spring service or such as you may order me to carry out. In closing this narrative I desire to express my obligations to John Justus, James Snyder, Edward Yates, C. C. Wrenshall, and the employés who remained with them, exposed on the grassed islands of Platte river, in charge of weak stock, during the terrible storm of thirteen days, encountered by the expedition on its passage through eastern Nebraska, when coming to the States. Careless travellers having burned the grass along the route, it became necessary to move the expedition faster than was deemed expedient to drive some of the tired stock. The party which remained with the mules and horses left behind covered them during the night with their own blankets, and kept them alive until a return train was sent out with a supply of forage. Mr. James A. Snyder is also entitled to be mentioned for having remained in charge of the supply stations of the mountain work, often without a companion, in exposed situations at the edge of the Crow and Pannack country. I have given the names of the members of the expedition to whom I am particularly indebted a prominence in this public statement, because success has only been achieved by their hearty co-operation, energy, and obedience. Many of them were hired at much lower rates of pay than they could have obtained on the border by not going upon the work. I also take this opportunity of stating my appreciation of the excellent employés, all of whom have sustained me in carrying out your instructions.

Construction.—Amount of work done.

Miles of grading.	Cubic yards of excavation.	Total cubic yards of excavation.	Miles of rock excavated.	CLEARING.		Remarks and locality.
				Miles heavy pine.	Miles of willow.	
2⅓	4,560	4,562	--------	--------	1	Between South Pass and Piney Cañon.
4½	8,797	13,359	¼	¼	3	In Piney Cañon.
⅓	651	14,010	--------	--------	--------	Fort Piney.
⅛	243	14,253	--------	1	--------	Between Fort Piney and foot of mountain.
3	5,865	20,118	--------	3	--------	Foot of mountain to Labarge creek.
⅛	243	20,361	--------	1	2	On Labarge creek.
3⅓	6,516	26,877	--------	1¼	1½	From Labarge to road's leaving first branch of Smith's Fork.
⅛	243	27,120	--------	⅛	--------	First branch of Smith's Fork to summit of mountain.
4¾	9,286	36,406	100 yds.	4½	--------	Between summit of mountain and Main Smith's Fork.
1	1,955	38,361	--------	⅛	3½	Along Main Smith's Fork.
4	7,820	46,181	⅛	4	--------	Between Smith's Fork and Salt river.
¼	489	46,670	--------	--------	⅛	Salt river.
2	3,910	50,580	¼	10	--------	Between mouth of cañon and West's camp.
6	11,730	62,310	--------	--------	⅛	West's camp to main emigrant road.

62,310, total number of cubic yards of excavation, of which 25 per cent. is loose rock and ledge.
1 mile of rock removed.
23 miles of heavy pine clearing. The pine timber extends over about two hundred miles of the route.
11 miles of willows cleared.

Estimate of cost of expedition from April 1, 1858, *to December* 1, 1858.

Amount expended		$67,873 12
Value of property on hand and available for use, viz:		
Transportation	$16,797 84	
Camp equipage, &c	2,498 57	
Provisions	4,051 59	
Debts of old expedition and not chargeable to the present one	4,264 35	
		27,612 35
		40,260 77

WASHINGTON, D. C., *January* 7, 1858.

SIR: Above please find the estimate of the cost of the expedition for the eight months ending November 30, 1858.

Very respectfully, your obedient servant,

JNO. H. INGLE,
Disbursing Clerk.

F. W. LANDER, Esq.,
Seperintendant, &c.

Property of expedition and employés; where situated.

The following extracts from the report of Mr. J. C. Campbell explains the situation of the stock and government property in his charge at Salt Lake City.

Extract.—"I have sold six yoke of oxen, two yoke at $100 and four yoke at $90. I have now on hand fourteen (14) mules, three (3) horses, and seven (7) head of cattle. The stock is in excellent order, but everything is enormously high here. November 26, 1858."

Wagons, harness, provisions, arms, tools, &c., as per schedule A, on file.

Property cached by J. C. Campbell, as per schedule E, on file.

Mr. Campbell retains Edward Williamson, Isaac Frappe, and Frank Truchet, all excellent mountaineers, subject to dismissal or retention, as he may think proper.

Cached in fort at Piney Cañon, tools, for which see schedule C, on file.

In charge of C. H. Miller at Fort Gilbert, South Pass, Rocky mountains: tent, provisions, tools, &c., as per schedule I, on file.

Mr. Miller is directed to take barometrical observations during the winter, and to collect such information as will undoubtedly be valuable to the country. His reports for October and November have been received.

At Fort Laramie, receipt being taken from S. E. Ward, sutler: provisions, wagons, stock, &c., as per schedule E, on file.

At Troy, Kansas Territory, in charge of William H. West, arms, saddles, &c., as per schedule F, on file.

With Mr. West are A. Mitchell, C. C. Wrenshall, E. L. Yates, Jerome Boles, Anthony Cosgrove, and the four Mexican employés.

At St. Joseph's, Missouri, in charge of Cogwill & Co., receipt having been obtained: wagons, harnesses, arms, blankets, &c , as per schedule C, on file.

At Washington city, John H. Ingle, disbursing clerk; James Ingle, commissary; William H. Wagner, R. L. Poor, and Melchior M. Long, engineers.

The Engineering.

The engineering corps of the present season was a very small one. The amount of money expended has been almost exclusively devoted to the carrying out that clause of your instructions which directs "the most vigorous prosecution of work on the wagon road."

The following extracts from a report of Mr. John Lambert, engineer, and the report of Mr. Wm. H. Wagner, first assistant engineer, refer to the engineering:

Extract from Mr. Lambert's report.

"The unusual agreement of the following results for latitude at this camp will be sufficient excuse for asking attention to them; as they compare fairly with the results obtained with larger instruments, and published as specimen work or illustrations in astronomical books:

By "Antares" twice, July 21 and 22...	42° 31′ 50″.95 (both the same.)
By Ophiuchi..	42° 31′ 54″.4
By Ophiuchi. ....24th and 25th...	42° 31′ 50″.66 (both the same.)
By Altair..............................25th...	42° 31′ 51″.5
Mean..	42° 31′ 51″.52

Had it not been for the prevailing cloudy nights and an accident to the watch used before I could get a complete set of "Luna Distances,' I have no doubt that I should have obtained results as reliable for longitude before this time. I made an attempt to observe an eclipse of the first sattelite of Jupiter, which is now above our horizon in the morning, but the glasses in the party are too feeble for distinct vision in presence of the moon. In the hurry of immediate computation at night, I mostly omitted some small corrections, such as for mean declination, height of barometer, &c., but which leave no error perceptible in the general maps, these also I propose to correct in Washington."

Report of Wm. H. Wagner, first assistant and acting engineer.

WASHINGTON, *January* 19, 1859.

SIR: I have the honor to submit the map and meteorological notes collected during the progress of the expedition.

The map contains the results of surveys and reconnaissances of the first and second expeditions through this section of country. The astronomical observations for latitude were made by Mr. J. Lambert and Mr. R. L. Poor, with great accuracy, along the new worked road. The want of proper instruments and the short sojourn in any one place prevented observations being taken for longitude, but the utmost care has been taken to supply their place by exact measurements.

In connexion with the survey, several important reconnaissances have been made by Messrs. Poor and Long and myself. This side work, resting upon the base line of the surveyed route, completes in some measure that of last year.

Twenty-three (23) meteorological observations were made at Aspen Hut, and ninety (90) at Piney Fort, by Mr. Snyder. Twenty-seven (27) readings were made at the mouth of Piney Cañon, and one hundred and forty along the line of the new road. These last were taken at each important break of the surface. It is impossible to note on the map all the heights thus obtained for fear of confusing it. In computing these heights, and to get reliable results, due care was taken to observe the directions given in the work of Lieutenant Abbot, topographical engineer, in reference to the corrections to be made in barometrical readings. The formulæ used in computation were those of Guyot, as published by the Smithsonian Institution.

Since the departure of Mr. Lambert from the charge of the engineering work of this road, I have been most ably assisted by Messrs. Campbell, Poor, and Long, and am indebted to them for their cheerful and energetic aid in carrying out the work entrusted to my charge.

I am, sir, very respectfully, your obedient servant,

W. H. WAGNER,
First Assistant Engineer in charge.

F. W. LANDER, Esq.,
Superintendent, &c.

The barometrical data and the journals, note books, itineraries, &c., of the expedition, from which the results offered are made up, are on file in the office, but not now transmitted, as they would increase the size of this report to unreasonable limits.

Description of the old roads westward from the South Pass, and the amount of emigration over them in the year 1857.

The following extracts from Assistant Engineer John F. Mulloney's report of last season, who was placed in charge of surveying and examining the old roads while I was making the reconnaissances of the upper unexplored country, afford valuable information. My own examinations of the old emigrant roads were made in 1854, and led me to suggest the propriety of further explorations prior to building the overland wagon road.

Extracts from Mr. Mulloney's report.

"The line cannot well be changed for the better from the South Pass to the forks of the road, near Little Sandy creek. It is an even and broad gravel surface. From the forks of the road it passes over a gravel surface mixed with sand, affording little grass, save in the early part of the season, and which soon withers during the summer months. From the forks toward Crow creek, (a small stream so called near the base of the Bear mountains,) it is mainly an elevated table land, a smooth surface of alluvial deposit, mixed with fine sand and gravel, of arid and sterile appearance, and yielding nothing but stunted sage. In crossing this desert, both man and beast suffer from the long, tedious marches, without water or grass. The wheels of the wagons sink deep into the dusty soil, and the hauling is slow and hard. The strong winds which prevail here during the summer months sweep over the level plains, whirling the loose deposits into thick clouds, obscuring the sight, and filling both eyes and nostrils with dust. The hot, dry air parches the lips and throat, and even makes respiration difficult.

"This waste, therefore, has long been known as one of the most dreaded parts of the road travelled in crossing the Rocky mountains. Of the several routes across it I consider none worthy of improvement, unless with the view of dividing the emigration. To do this, experiments might be made by sinking ordinary wells at suitable points to obtain a supply of water. If this attempt should not be made, I dismiss the subject of the whole of these routes from any further consideration, as possessing nothing in their favor to recommend them compared with the Wind River mountain route, by way of the New Forks of Green river, reconnoitred and examined by yourself."

EMIGRATION OVER THE SOUTH PASS ROUTE BY THE OLD ROADS.

I furnish the following interesting schedule from the report of Mr. B. F. Ficklin, of my advance exploring party of 1857. It gives information of the number of wagons crossing the Green river ferries, and a description of the roads over the ungrassed regions west of the South Pass, and the desert towards Slate creek.

Extract from B. F. Ficklin's report, August 15, 1857.

The Mormon road.—This road crosses at the Mormon ferry of Green river.—(See map.) It is one hundred and fifteen miles from the South Pass, on this route, to Crow creek, the connecting point of all the roads. Eighty wagons crossed this ferry to date, only twenty of which belonged to California emigrants.

The Kinney road.—It is one hundred and thirteen miles from the

South Pass to Crow creek. With the exception of the last six miles it is a hard, gravelly, gently rolling, and unexceptionally good road. Very little grass; sage for fuel.

Over two hundred and twenty wagons have crossed the Kinney ferry for California up to date. The numerous loose animals not counted by the ferrymen, as they are generally crossed by swimming.

The Sublett road.—This, the northernmost of the old emigrant roads, crosses the desert by a distance of fifty-two miles, and has a side line to the Desert spring; water of the Desert spring slightly impregnated with sulphur and alkali; the spring is thirty-two miles west from the Big Sandy. To Crow creek, by the main Sublett road, one hundred and seven miles; by the spring route, one hundred and twelve miles.

One hundred and fifty wagons had crossed at Sublett's ferry. No account kept of loose stock.

Davis' road.—It is one hundred and eleven miles from the South Pass to Crow creek by this route, which is preferred by emigrants.

Five hundred and sixty wagons have crossed at Davis' ferry up to this date; number of loose animals not noted. The Mormons' estimate for loose cattle driven to California the present season is seventy thousand.

The different ferries at Green river are what are called rope ferries. The boats are badly and roughly constructed. They are built of pine timber, and are not over thirty feet long, making it necessary to pull wagons into and out of the boats by hand. This is a tedious job. The cattle are forded, or in high water swam over, attended with risk both to cattle and drivers. The price charged for ferrying varies from three to six dollars per wagon, depending on the stage [illegible]. The Kinney and Mormon ferries are owned by Mormons, and are in Utah Territory.

The above was a very small emigration, less than one-third what it was in 1854, when I passed along this route from Oregon. Apprehension of a Mormon war reduced the number of emigrants.

The tolls of bridges and ferries are as follows on the South Pass road:

Laramie river	$2 00
North Platte	5 00
Five other small bridges	10 00
Bear river ferry (Owens' road)	4 00
Green river	4 50
Total	25 50

Twenty-five cents per head is paid by cattle drivers for loose stock, in the highest stages of water.

In a large emigration, fifty thousand dollars is a small estimate for tolls paid by overland emigrants. We cannot estimate loss of stock by the old road at less than twenty per cent. of the whole number driven.

Mr. Miller's report of the travel of *October and November*, 1858, is given below, the latter going to Salt Lake, and consisting of freight trains:

SOUTH PASS, ROCKY MOUNTAINS,
Gilbert's Station, November 30, 1858.

All snow falling previous to November 20 did not remain long on the ground. The snow in the pass is now six inches deep. It is three inches at Green river.

The travel past this station in October was—

Outfits (various kinds)	59
Men	838
Women and children	9
Horses	91
Mules	369
Oxen	4,851
Wagons	490

In November—

Outfits	36
Men	528
Women and children	—
Horses	100
Mules	207
Wagons	107
Oxen	932

As my party was off the line of the old roads from May until October, I cannot give the amount of travel, which was large.

EMIGRANT GUIDE.

The following schedule, made up in the simple forms in use by overland travellers, will be of service to emigrants:

TO EMIGRANTS.

Gilbert's station, at the South Pass, (last crossing of the Sweetwater river,) is the point at which you had better leave the old road, for fear of getting lost among the different camp trails. Gilbert will direct you.

You must remember that this new road has been recently graded, and is not yet trodden down; and, with the exception of grass, water, wood, shortened distance, no tolls, fewer hard pulls and descents, and avoiding the desert, will not be the first season as easy for heavily loaded trains as the old road, and not until a large emigration has passed over it.

All stock drivers should take it at once. All parties whose stock is in bad order should take it, and I believe the emigration should take it, and will be much better satisfied with it, even the first season, than with the old road.

	Intermediate distances.	Total number of miles.
From Gilbert's station to Aspen Hut Good grass and water. If the grass has been eaten off by the Salt Lake trains, go—	3. 50	----------
To Long's creek Here you have a good camp, the grass on the hills being excellent. Willows on creek, aspen or mountain cottonwood to left, pine timber to left, crossing good gravel bottom.	2. 20	5. 70
From Long's creek to Clover creek Good grass and water.	2. 23	7. 93
From Clover creek to Garnet creek Good water and fine grass; aspen timber. From this creek to the Sweetwater it is a rolling country, with fine bunch grass. Pine timber as you approach the river.	3. 14	11. 07
From Garnet creek to Sweetwater River crossing You will find this a good camp. Fine grass and heavy pine timber a short distance up the creek to right.	4. 95	16. 02
From the Sweetwater to crossing of Poor's creek Excellent grass and fine timber to left of road. Good camping places all the way for nine miles, the road following up the stream for that distance.	1. 59	17. 61
From Poor's creek to Little Sandy creek Good grass; abundance of pine timber. Four miles from crossing the road descends into a large grass plain, called Antelope meadow. A great many antelope here. Camp near the rocks, where you can have cedar for fuel.	11. 66	29. 27
From Little Sandy to Big Hole of Big Sandy A good laying up place. A large valley; abundance of grass and pine timber.	5. 33	34. 60

SCHEDULE—Continued.

	Intermediate distances.	Total number of miles.
To crossing of Big Sandy	5. 00	39. 60
Hard pitchy road. A steep pitch to go down to the river.		
From Big Sandy to Grass Spring	8. 15	47. 75
No wood, but fine grass and water; abundance of sage for fuel.		
From Grass Spring to New Forks of Green river	18. 56	66. 31
This distance can be shortened by striking toward a clump of timber to the right and finding good camping grounds; then by following down this stream to the left a short distance you strike the road at the crossing, which is good. There is a large island in the centre, and the stream on each side is from twenty to thirty yards wide. In the spring it is from three to four feet deep. You had better raise the beds of your wagons. Timber on island and western bank.		
From New Fork to Green river	5. 51	71. 82
From this point you can strike south, and in four miles come to Piney creek, with good grass, and plenty of timber for camps. This, however, can only be done late in the season, for in the spring it is marshy, and you had better keep the beaten trail, on which you will find water and grass enough even for laying up.		
From Green river to White Clay creek	8. 00	79. 82
Alkali along its banks, but clear running water in the bed of the creek.		
From White Clay creek to Bitter-root creek	5. 18	85. 00
Good grass; large willows on its banks for fuel.		
From Bitter-root creek to north fork of Piney	10. 32	95. 32
Willows on banks; one mile to left pine and cottonwood timber.		
To middle fork of Piney creek	3. 00	98. 32
Good grass; large willows for fuel.		
From Middle Fork to mouth of Piney cañon	1. 54	99. 86
Cañon from a quarter to one and a half mile wide.		
From mouth of cañon to Piney Fort	7. 70	107. 56
The road through the cañon crosses the creek eight different times; all the crossings, however, are good. You will find several camping spots in the cañon, between its mouth and Piney Fort; you had better lay over at Piney Fort, as you have excellent grass, and a block-house, with corral attached. The country for thirty miles beyond is thickly timbered, which will render it necessary for you to keep careful watch of your stock. You should move as rapidly as possible over to Salt river. After leaving Piney Fort the road passes over a ridge and crosses a small creek within half a mile; thence crosses mountain—		
To Labarge creek	5. 19	112. 75
Road follows up creek for half a mile, crosses and passes along low ridge for a short distance, when it strikes the—		
Crossing of small creek in valley	2. 55	115. 30
To crossing of another small creek	. 43	115. 73
Good grass.		
To crossing of Spring branch in valley	1. 39	117. 12
Enclosed by high ridges. After crossing another small creek road enters—		
Labarge valley	. 89	118. 01
Good grass on hill to right.		
To junction of Labarge and Spring creek	1. 84	119. 85
Road from this point lies over a mountainous country.		
From Spring creek to first branch of Smith's fork of Bear river	2. 57	122. 42
You travel along this stream for one and three-fourths of a mile. Good grass in timber.		

SCHEDULE—Continued.

	Intermediate distances.	Total numbe of miles.
To Smith's fork of Bear river Valley narrow; thick growth of willows half a mile up this stream to right from where the road strikes it and further. You will find good grass on the hills and in the valley. Road follows down Smith's fork and crosses—	7.44	129.86
Little Beaver creek	2.04	131.90
From Little Beaver creek to spring near the top of the mountain. Before reaching this point you pass through a small body of aspen timber. Be careful here to keep good watch of your stock, as this timber is very thick with Indian trails running north and south, upon which your stock is apt to stray, and you will not be able to recover them. You are now leaving the friendly Indians and reaching the Pannack country. Treat them kindly or you may have some trouble. Road ascends hill for one-fourth of a mile, then descends gradually. From here to old road grass is very abundant in all valleys.	1.88	133.78
To Salt River valley Good grass.	3 91	137.69
To crossing of creek Gravel bottom; road follows up valley—	1.04	138.73
To crossing of Small Spring creek Valley widens, and is covered with excellent grass.	2.50	141.23
To Salt River crossing Half a mile northeast of crossing Janvier's fork of Salt river, coming in from the right, unites with the main stream.	5.95	147.18
To west branch of Salt river Good grass. Valley at this point about four miles wide; road runs along valley.	4.83	152.01
To Smoky creek, (mouth of cañon) Road crosses creek and enters cañon, which is one and a fourth mile long.	6.47	158.48
To Red Willow creek You will find good grass in the bottom.	2.00	160.48
To Salt Bottom Surface of ground in many places white with pure and excellent salt. A good laying up place to salt your stock. Water clear and fresh; grass very fine. Here the road leaves valley and ascends bench, crossing several spring branches, keeping, however, the general direction of the valley.	3.00	163.48
To Kinni-Kinnikc reek cañon Cañon one mile long, cross creek twice. After crossing seven spring branches and two small creeks you come—	4.00	167.48
To Noon creek You then cross two spring branches and come—	3.08	170.56
To Flat Valley creek Large valley of fine grass.	2.43	172.99
Crossing of another creek Good grass all the way—	1.75	174.74
To Large Grass valley In which is a lake several miles long. You travel up valley, on edge of lake, crossing two sloughs. At end of valley you come—	2.23	176.97
To a creek Which is a branch of Otter Spring creek. Fine grass.	10.27	187.24
To Otter Spring creek Good grass.	1.38	188.62
To spring in valley Water brackish; good grass.	7.85	196.47

SCHEDULE—Continued.

	Intermediate distances.	Total number of miles.
To branch of Blackfoot Good grass.	.87	197.34
To Blackfoot river Crossing good; fine grass. You leave river here to right.	1.85	199.19
To Granite creek Good grass; willows on creek.	3.53	202.72
To crossing of creek	1.30	204.02
To point where road leaves Blackfoot river	4.79	208.81
To Thistle creek One mile to right a small grove of aspen timber; grass good. Road crosses two small creeks.	1.82	210.63
To head of Portneuf river Aspen grove and good grass at crossing.	4.89	215.52
To road from Soda Springs	1.24	216.76
To entrance of cañon Spring branch runs through this cañon, which is three-fourths of a mile long; grass good.	1.12	217.88
To small stream coming in from the left	.89	218.77
To two small streams emptying into Ross' fork Fine grass.	9.75	228.52
To Emigrant road Thence follow old Emigrant road, and in one-eighth of a mile cross a small branch. Road level.	.94	229.46
To Ross' Fork Cross creek and enter cañon, which is about one and a half mile long	1.47	230.93
To Snake River valley and fork of roads You take right hand road to Fort Hall, and the left to bridge on Ross' Fork. The latter is the main or short road.	11.18	242.11
To bridge on Ross' Fork Good grass. Road good.	2.38	244.49
To bridge on Portneuf river Fort Hall is in sight from this point, Portneuf mountains to left. Fine grass, but little timber in valley.	8.00	252.49
To stream in Portneuf valley	.23	252.72
To slough in Portneuf valley	.42	253.14
To road from Fort Hall	.60	253.74
To Fort Hall and Salt Lake road Road from bridge on Ross' Fork lies over a very level country, sometimes in valleys, but principally on bench land. Willows and grass on creek.	3.15	256.89
o Pannack river Good grass.	6.50	263.39
o Irvin's old fort	4.36	267.75
o Big Spring At all the above points you touch Snake river. This spring is about thirty feet in breadth, and is formed of innumerable small ones.	6.99	274.74
o American falls of Snake river You keep along river, and one mile on cross a steep ravine. Timber.	1.93	276.67
o crossing of creek	3.33	280.00
o crossing of creek	1.66	281.66
o ravine Rocky island opposite mouth of ravine. Fine grass; some pine timber. Within the next three miles you cross three ravines with timber and grass.	.83	282.49

SCHEDULE—Continued.

	Intermediate distances.	Total number of miles.
To crossing of creek Timber and grass. You cross a ravine in half a mile.	5. 79	288.[illegible]
To Fall creek Steep bank on west side. Timber and grass.	2. 91	291.[illegible]
Leaving Snake River bottom to right	2. 03	293.[illegible]
To Raft Creek crossing Good grass; willows for fuel.	6. 16	299.[illegible]
To second crossing of Raft creek Good grass.	3. 60	302.[illegible]
To third crossing of Raft creek Good grass.	11. 11	314.[illegible]
To forks of road Junction of this road and Hedspeth's cut-off.	8. 81	322.[illegible]
To crossing of small stream Road crosses two small streams within the next half mile.	3. 50	326.[illegible]
To fork of Raft creek Good grass; willows for fuel.	2. 84	329.[illegible]
To crossing of creek Good grass; no timber.	10. 74	339.[illegible]
To crossing of small creek	2. 00	341.[illegible]
To entrance of Rocky cañon Cañon three-fourths of a mile long.	2. 33	344.[illegible]
To City rocks Good grass and camp ground on small Spring branch. Thence the usual route to California.	1. 23	345.[illegible]

Table of distances from Fort Leavenworth to Gilbert's station at the South Pass, (last crossing of the Sweetwater river.)

	Intermediate distances.
From Fort Leavenworth to Fort Kearney	294
From Fort Kearney to Fort Laramie	335
From Fort Laramie to Gilbert's station, (South Pass)	270
Total number of miles	899

LOCATION.

The following extracts from my report of last year, when chief engineer, made to W. M. F. Magraw, superintendent, on his arrival at the South Pass, presented the subject of location, as I was then able to weigh it:

"Sixteen mountain passes have been explored, the topography of the Northern Wahsatch mountain chain thoroughly defined, and several practicable wagon routes discovered, with very important cut-offs and connexions. * * * Of these wagon routes the two principal ones are a southern and a northern line, at the extreme verge of the limits of explorations named by the department. * * * * Of the two main routes either can be built within the limits of the amount appropriated by the department for the work of this division. To either of them, therefore, may be applied the word practicable;" both of them cannot be built for the amount of the appropriation. The act of Congress, as interpreted by the department, is "to construct a wagon road from the South Pass to City Rocks, on the shortest practicable route." The shortest practicable route is the southernmost of these two main lines, and is seven days nearer travel to the City Rocks than any of the old emigrant trails. That it is the shortest practicable route is the engineering deduction; but that it is the best route for an emigrant road is denied by many of the most experienced traders and employés of overland trains, to whom I have described its facilities and disadvantages. The northern route, on the contrary, is but a few days travel shorter than the present emigrant roads, but is so abundantly furnished with grass, timber, and pure water, with mountain streams abounding with fish, plains thronged with game, and so avoids the deleterious alkaline deposits of the south that it may be described as furnishing all that has been so long sought for through this section of the country—an excellent and healthy emigrant road, over which individuals of small means may move their families and herds of stock to the Pacific coast in a single season, without loss.

"This northern route also passes in the vicinity of what, in my own belief, will prove to be the very best northern railroad line across the continent, when all routes are properly located and surveyed by practical building engineers of such experience in all varieties of construction, of deterioration and wear of way, as to comprehend the contingencies and requirements of the interesting problem of a railroad through 2,000 miles of uninhabited country.

"In the choice between these routes, beyond the engineering presentation of surfaces, acclivities and distances, the word practicable is susceptible of many definitions; for in some measure repeating conclusions, a straight or the shortest route may be practicable for the passage of emigrant wagon trains, but sparsely grassed, and one which would not be selected by emigrants, if built by the department. It may mean a short line as a mail route of easy grades, and if supplied with forage stations suited to the rapid transit of mule and horse teams—a route, too, to be easily supplied with these forage stations from its passing in the vicinity of the Salt Lake settlements—this would mean the southern route. Here stands, too, the definite interpretation of the act of Congress by the department: 'The shortest practicable route from the South Pass to City Rocks.' No one can deny that the southern route is the shortest; it is highly practicable; it is the cheapest: for, by access to the Utah populations, it can be more quickly and advantageously built than the northern, or in fact than any other, and in proportion to its length is as well supplied with grass and water as either of the old emigrant roads. Even if the projectors of the wagon road bill advocated if as an aid to the overland emigration, and if for this purpose we should more properly select an excellent roadway of détour, abundantly furnished with wood, water, and grass, and presenting no natural obstructions which cannot be removed within the limits of the appropriation, and one particularly adapted to the great claims of the ox-team emigration, that class of population yearly flooding the great plains, and adding so much to the strength and prosperity of our Pacific possessions, yet we are not called upon to go so far behind our instructions, or to assume responsibilities not necessary to be borne."

The result of this communication was that I was instructed to go to Washington and confer with you on these subjects. You directed me to build the northern route, and it has been constructed the present season.

A review of the statements of my last year's report now becomes necessary. During my absence important changes appear to have taken place in the views which have led to the passage of appropriations for constructing emigrant wagon roads. If it is to be held that the new road is to be used as a winter mail route across the continent, then it is not properly placed. It is especially and emphatically an emigrant road, so located as to avoid the tolls of bridges, alkali plains, and deleterious and poisonous waters, and to furnish fuel, water, and grass to the ox-team emigration. And it is neither the very shortest nor the very best which would be selected for a winter route in the vicinity of the same parallel of latitude. The overland emigrants reach the mountain sections in the latter part of July, and pass over the adjacent sand plains during July and August. The chief difficulties and obstacles which they encounter arise from the extreme dryness and heat of the artemisian deserts. The passage of the line as located nearer to the base of the snow-capped mountains, in a more elevated region, richly grassed, and along the great summer trails of the Indians, is favorable to their health, the preservation of their stock, and gives them abundance of pasturage, with water at short intervals from mountain streams. These very streams, stocked with mountain trout, soon disappear, or become stagnant pools, after reaching the sand plains. A railroad from the South Pass toward the Pacific could make the passage of these sand plains over a more level country, or by détour would pass toward the north of the valley of Snake river by much lower passes than those which have been adopted for the wagon road, and it would encounter only one, and that one the very lowest of the Wahsatch mountain ranges, at a point where it breaks down into low foot hills, offering no obstacle to the favorable passage of a railroad line which could be built without a tunnel. The wagon road, on the contrary, although not at a long distance from this line, has been carried along the base of the higher ranges, and over a country of easy slopes, but at greater elevation above the sea. As to mail facilities, a very excellent mail route—probably the best in that region of country, permitting a short connecting line with Oregon and Washington, through Salmon River valley, avoiding the Snow mountains—can be obtained north of the Wind River ranges to the great valley of the Snake, by a pass which is travelled in the winter by the Indians and mountaineers. A very good one also exists by the old emigrant wagon road. A third is that described in my last season's report, as above quoted, extending to Cache valley. This southern or Cache valley route would connect with the new line from Bridger's Pass, constructed by Captain Simpson, of the War Department, and is also much more direct towards California than any other route from the South Pass, north of the Great Salt Lake. The line explored the present year by Mr. Wagner, in completing my engineering work of last season, would connect with this southern route into Cache valley, and I have already received your instructions to build it with the tools and appliances remaining of this year's expedition. But if the Bridger's Pass road is found to be practicable, that is, supplied with water and grass, during July and August, for the passage of a large emigration, then the construction of this main southern route by Slate creek would enable the emigration to avoid the passage of the farms of the Mormon population, except at Cache valley, and relieve them from the great want of grass experienced by their trains in the vicinity of Salt Lake City. But from the Old South Pass road it would not prevent the emigration from travelling that terrible range of country extending from the South Pass to Slate creek; nor would it save them from the ferries of Green river and two crossings of Bear river, either by bridges or ferries. I can only say, therefore, that, although in reality a better road for an overland mail than the one which I have just completed, it is not so good for an overland emigration, unless that emigration takes the route by Bridger's Pass.

The question as to whether the emigration will prefer the Bridger's Pass route must be solved by knowledge of the grass and water on it late in the season. There is always water enough in the early spring, or before the emigration arrives, at the mountains in the small lakes and pools made by the melted snow.

RESOURCES OF THE COUNTRY.

All of the large valleys in the vicinity of the South Pass are suitable for grazing purposes, and many of them adapted for settlements. The elevation of this range of country has not prevented its occupation by the Mormons. Crops of wheat have been raised on the emigrant road at various points, even at so great an elevation above the sea as Independence Rock. On the headwaters of the Snake and Blackfoot rivers enormous crops of wheat and barley have been raised. The country in the more elevated ranges is very fertile, and the condition of the oxen, mules, and American horses of the wagon road expedition after their severe service of the season, the sale of these oxen at cost in Salt Lake City, and the successful return of the mules to the States, are sufficient guarantees of the value of these mountains as grazing regions. The country has been improved by the Mormon population so far north as the valley of the Salmon river. Farms extend through Malade valley, and are considered very productive. The eastern Shoshonee or Wash-i-kee band of the Snake Indians and the Pannacks of Snake River valley are adverse to communication with the Mormons, and will not permit them to settle upon their lands, at least at the present time. The Pannack tribe have repeatedly killed Mormon farmers and driven off their stock. The encouragement for the settlement of the country west of the South Pass, in the vicinity of the new road, either by the Mormons or by a Gentile population, would be of great service to the overland emigration. The new road touches only the northern extremity of the Mormon settlements at Blackfoot river, a tributary of the Snake, where, as previously stated, large crops of wheat are raised, but where a mill has not yet been erected. The new cut-off road which you have directed me to build into Cache valley, designated upon the plan by line II, will, however, pass near the Mormon farms, where flour can undoubtedly be purchased at low rates, and where the country is not yet so much taken up as to interfere with grazing facilities for the emigration. Nearly all this region is very heavily wooded, and the excellent pine and fir timber are so situated as to be easily transported by water. All the great tributaries of upper Green river have their sources in the foot-hills of the Wind River and Wahsatch mountains, and are heavily timbered with yellow pine. All the tributaries of the upper Snake river are likewise heavily timbered adjacent to the road. Should a railroad ever pass towards Salt Lake City, either by the Bridger's or by the South Pass of the Rocky mountains, this timber could be delivered on the line with great facility and at low cost. It can be furnished with equal facility in the passage of a railroad from the South Pass to the waters of the Snake river, and thence to the head of the Humboldt towards California, and by a branch road by the way of Salmon river, or the valley of the Great Snake, towards Oregon and Puget's Sound. In fact, if a forked road was built from any point near the South Pass, north of it or south of it, having termini at Puget's Sound and the Bay of San Francisco, no apprehension need exist regarding supplies of timber and fuel for the line for any number of years, either east or west, from these dense forests. Large quantities of excellent bituminous coal were discovered at distances of eighty and one hundred miles west of the South Pass. Supplies of coal were also discovered on Wind river. The quantity of mineral tar which exists in the vicinity of Wind river, known by mountaineers as the Oil springs, a variety of asphaltum or petroleum, would also greatly facilitate the working of a railroad. This substance is readily converted, by a simple chemical process, into lubricating oil, and the mere article of oil is a costly item of the running expenses of railroads. Excellent iron ore exists thirty miles north of the South Pass, and has been found in the mountains of the Great Basin, further south.

THE MORMONS.

In a previous report I informed you that on reaching St. Louis I was led to increase the size of the expedition from intelligence of the intentions of the Mormon population. This was prior to the departure of the Utah commissioners. I felt justified in this course from my own knowledge of this singular people and their peculiarities. The passage up the Platte and into the mountains was made without any difficulty whatever, so far as the Utah population was concerned. John Justus, my messenger to Salt Lake City to procure men, was enabled to proceed in the business of hiring them without interruption immediately on the arrival of Colonel Johnston's command. The greater part of the Mormons, however, who worked upon the wagon road came up after their return from the south, whither they had followed their leader, Brigham Young. I gave Mr. Justus particular instructions to ask no assistance from the influence of the leaders of the church in obtaining men, but to go openly among the people and state to them my intention to give them employment, without reference to their religion, citizenship, or nationality. Some of the Mormon bishops told members of the church that they would be turned out of it if they went to work for the United States government; at least I was so informed by these very men who, notwithstanding this caution, came up and aided in building the wagon road. I was assured by Ex-Governor Young, whom I visited while in Salt Lake City, that this was not the case, and that he would be very glad to have his people employed by me, not only because the work was one of public utility, but because it aided the people in getting a little money for the purchase of groceries and what they term "settlement supplies." The Mormons who worked upon the wagon road were very much pleased with their engagement, and returned to the city comfortably clad from the stock of clothing which had been taken to the mountains by the expedition. The existence of this Mormon population, and the supplies they are enabled to furnish, is a most important matter in making estimates for any public work to be carried on in that section of the country. They are very excellent laborers, many of them Cornish miners, who understand all sorts of ledge work, masonry, &c. The majority of the lower classes are trained in the use of implements of excavation, from the amount of picking and digging which is required in the building of the great irrigating ditches, and in the erection of the earth and rock fences by which the farms of the country are separated. They will prove of remarkable service should the proposed line of the Pacific railroad pass anywhere in the vicinity of their settlements. I paid them a dollar a day for work, but the next season I shall probably have to pay them at higher rates. Ex-Governor Young told me that he would engage to find laborers and mechanics to build that portion of a Pacific railroad which should extend across the Territory of Utah. The Mormons are very anxious that a part of the appropriation for the building of a wagon road through the South Pass may be devoted to bringing the road in the vicinity of their city; and they assured me that if the road could be made better in the vicinity of the city than it then was, nearly all the emigration would visit them for such supplies as could be purchased there. Governor Cumming also spoke to me in reference to the same matter, and I replied to him in writing, (the letter, I think, has since reached your department.) I have referred to this subject of carrying the road near the city in my remarks upon location. It would more properly be done as connected with the new road through Bridger's Pass. The measure suggested would undoubtedly prove of great service to the Mormon population, for much of the emigration, as is stated, does certainly pass through Salt Lake City, some of it wintering there.

THE INDIANS.

No difficulty occurred with Indians on the way up the Platte; a small party of horse thieves, supposed to be Pawnees, entered the camp during the night, about 25 miles east from Fort Kearney; they were fired upon by the guard, took to the water and crossed the Platte river. The Sioux also visited the camps, and were treated with hospitality and kindness.

After leaving the South Pass, on my passage west, with an advanced party, I met the whole of the great tribe of the eastern Shoshonees, under the direction of the celebrated Wash-i-kee. They were on their annual hunt near the headwaters of the Green river, surrounding antelope. The Indian presents which I had proposed taking to this tribe were then behind me in the train of S. E. Ward. Having with me a very find herding horse, I presented him to the chief, and talked with him upon the subject which brought me to the country. Wash-i-kee's reply to what I said to him was very characteristic. He remarked, "that it was never the intention of the Shoshonee tribe, at least his portion of it, to fight the whites; that he had himself been fired upon by emigrants, but had always taught his young men that a war with the 'Great Father' would be disastrous to them. He said, before the emigrants passed through his country, buffalo, elk, and antelope could be seen upon all the hills; now, when he looked for game, he saw only wagons with white tops and men riding upon their horses; that his people were very poor, and had fallen back into the valleys of the mountains to dig roots and get meat for their little ones. They did not complain, however, for they knew they could not conquer the whites or drive them out of the country. He said he did not even propose to fight, notwithstanding the building of this new road would destroy many of their root grounds and drive off their game. Other Indians had told him that if he killed some whites the 'Great Father' would then send him a great many presents to keep him from killing any more. He wished me, however, to say to the 'Great Father' that his people were waiting to hear from him; that they did not stand with open hands that he might give them presents, but they hoped he would be just and treat the Snakes as if they were really his children, as the white men had so often told him he would do."

I told this heroic and manly chief, known among the mountaineers by the term "The White Man's Friend," that he would obtain as much from the American government as if he endeavored to compel gifts by force of arms; that his course in the Mormon difficulty was worthy of admiration; his refusing to take part with or against the Mormons was sufficient proof that he did not desire war to the prejudice of any of the white people, and only wished properly to represent his tribe. I promised him nothing, because, if I failed to fulfil that promise, I should excite every feeling of a cruel and vindictive nature to its extreme of enmity. Although the Snakes or Shoshonees have probably suffered more than any other tribe from the passage of emigration along the narrow valleys of their rivers, driving out their game, it is a peculiar and very remarkable fact that they have hitherto received nothing in the way of presents from the American government, while the Sioux and Cheyennes, whose broad plains are stocked with buffalo, have been paid annuities for many years. A sum of from $2,000 to $5,000 might properly be used in this connexion with great advantage to the overland emigration, and perhaps to the prevention of one of those desolating Indian wars which have cost the government so much trouble and expense. A war once commenced may be considered as never closed; for the relatives of warriors killed will invariably, whatever may be the disposition of the chiefs of the tribe, cut off lone parties of emigrants and single men. It is part of the nature and religion of an Indian to take blood for blood; and although naturally cowardly, greater risks have been encountered by them for the purpose of making this sort of retaliation than is often attempted in the wars of more civilized nations Although Wash-i-kee declares his intentions to be friendly, the Snakes will be much injured by the passage of the new road by emigrants. The following extracts from Mr. Miller's report are worthy of note:

South Pass, *November* 8, 1858.

The Snakes are wintering on Wind river, and the last accounts from them say they are in a starving condition; they are at war with the Crows, and are afraid to go out to hunt for game. On the 27th of October they had a battle with a party of Crows, and killed ten. Wash-i-kee is very much dissatisfied with the Crow agent, and says if Uncle Sam does not do better by him he will let his band steal from the whites all they wish. He says they are cheated every year. The Pannacks have burned Fort Thompson to the ground; they are wintering with Wash-i-kee.

The new road in many instances follows the summer and fall trail of the Shoshonee tribe. The animals of the emigrants will destroy the grass in the valleys where the Indians have kept the pine timber and willows burnt out for years as halting places in going and coming from their great annual buffalo hunts, and I believe, even beyond the mere question of policy, that it would be a very unjust and cruel course of action for the government to pursue should we take the use of their lands without reimbursement to the tribe.

After passing the Shoshonee or eastern Snake tribe I entered the country of the Pannacks, a very dangerous, cruel, and vindictive race, intermarried with the Shoshonees, speaking a language closely similar, but with no regularly constituted chief, and only respecting the great Wash-i-kee, and sometimes joining his tribe in their excursions to the buffalo country east of the Rocky mountain range, or in wars against the Crows. The Pannacks hold the whole country from Blackfoot creek towards Fort Boisé, and extend north to the northern Snakes, or "Sheep-Eaters." After my working parties were placed in the main Wahsatch mountain range, being with Peter Gabriel, the mountaineer, some days' travel in advance of the pioneer train, laying out the road, I fell in with one of the outlying parties of the Pannack tribe. Both myself and my comrade could use the language of signs remarkably well, but neither could speak the Shoshonee or Pannack language well. The Pannacks had recently killed many Mormons and stolen their stock. It was a position of extremity with us, for a council of war was held, in which we were not permitted to join. The medicine pipe was smoked, and a discussion took place as to whether we should be killed or not, the Indians believing us to be Mormons. While the chief and the leading men were holding council I approached them, and, taking the pipe from the hand of the last smoker, smoked it myself, and told them, by the language of signs, that I had come a long way to see them, but that I could only hold a talk at my own camp, which was three days' ride back. At this time the women and the young men came forward, crying with loud voices, in the Shoshonee or Pannack language, "Shoot, shoot! they are Mormons." The nominal chief of this party, however, who is a temperate and quiet man, said that we had visited them in their camp, and that he and six of his best warriors would go with us and hear more; that we might possibly be Americans, and that, although his heart was very bad against the Mormons, he loved the children of his "Great Father," and should not permit any harm to come to them within the borders of his camp. He set out some roots and boiled antelope flesh, of which we partook. The same afternoon the chief, with six of his warriors, joined us and rode for three days to the main camp of my party, on the head of Beaver creek. Before reaching the camp I despatched Peter Gabriel in advance, who brought back "Shoshonee Aleck," a half-breed now in the service of Mr. Campbell at Salt Lake, an interpreter and reliable man. After his arrival the Indians were satisfied as to my character and my business in the country.

Staying one day at our camp, I returned to the tribe, made them a few trifling presents, and obtained their good wishes for the success of our enterprise by stating that the "Great Father" would not probably destroy their hunting and root grounds by the passage of an emigration without paying something to reimburse to them the extreme loss which they must thereby sustain. These Indians are very much under the influence of a celebrated prophet of the western Snake tribe, who reside in the vicinity of the old Hudson Bay trading post of Fort Boisé. Should I receive your instruction to do so, during the next season I desire very much to visit this noted prophet and confer with him through a good interpreter. He is a man of great influence among these dangerous tribes west of the Wahsatch mountain range, and perhaps this influence may be gained in behalf of the whites. I

nsider him one of the most dangerous and desperate men now living
of the Rocky mountains, for the Indians have a superstitious
rence for him. He is extremely hostile to the Mormons. This
d partisan was the chief cause of the expedition against the Mor-
settlement of Salmon river, which was attacked by the Pannacks
the Snakes on their learning that the American government had
mmenced war upon the Mormons of Salt Lake. Under the direc-
of this man the Pannack and a portion of the western Snake or
shonee tribe attacked the Mormon fort, killed many of the set-
on Salmon river, drove off all their stock, and broke up this set-
ment entirely. The most direct route from the South Pass to
regon and Puget's Sound being through the Salmon river settle-
nts, the advantage to emigrants from the fact that flour can be
rchased there at low rates is one which cannot very well be surren-
red, and any treaty or arrangement which could be made with this
d tribe, permitting the Mormons once more to occupy their fort and
rms on Salmon river, would redound to the interests of the country.
t is believed by the most reliable men in the mountains that, in the
ent unsettled state of the Pannack tribe, the first small emigrant
ains which pass from Fort Hall towards Oregon will inevitably be
ttacked by both the Pannacks and the western Snakes. Even during
y visit to this tribe information was brought to me that some young
rriors had stolen several mules from a Mormon train which had
me up to Fort Hall with provisions for the mountaineers there. I
ployed Ten-toi, a celebrated young Indian who was of service to my
rty last year, and was mentioned in my report to you, to endeavor
find these robbers, and, if he were successful in securing the mules,
in to give them up to Mr. Campbell, whom I left behind, that he
ght take them to Salt Lake and return them to their Mormon own-
. Ten-toi is a man of great influence in the country as a success-
warrior, having distinguished himself in wars against the Black-
. He is not, however, a chieftain. An Indian known by the
me of Le-Grand-Coquin, (The Great Rogue,) a term applied to him
y the French half-breeds from his former horse-stealing proclivities,
the leading man among the Pannacks in the vicinity of Fort Hall
adjacent to our own line of road. I consider the Pannack and
stern Snake or Shoshonee tribes the most dangerous of all the
Indians whom I have ever visited. I do not think the term "treach-
rous," as usually applied to Indian tribes, is always just. We can
hardly say that a tribe is treacherous which definitely asserts, through
its chief, that it will not permit the passage of white men through
their country. It has been in the most manly and direct manner that
these Indians have said that if emigrants, as has usually been the
case, shoot members of their tribes, they will kill them when they
can. They undoubtedly use all the means and appliances of Indian
warfare, and, as barbarians, torture their prisoners; but if met with
the true spirit of American energy, with kindness and justice, there
is no difficulty whatever in approaching and subduing the worst ele-
ments of the Indian character; that is my opinion, after an expe-
rience of several years among them.

The western Shoshonees, termed by mountaineers the Sho-sho-kos, hold the country west of the Pannacks, on the road to California. They are a very dangerous and warlike tribe. It is a well known fact that the western Shoshonees, of Humboldt River and Goose Creek mountains, have sometimes ventured to attack an equal number of overland emigrants. They fight with the utmost determination, and, with the advantages which Indians inevitably procure in assailing whites, have often been successful in the destruction of small parties of our overland emigrants. They generally assail them from the willows of Humboldt River valley. When I heard that these Indians had broken out into hostilities, had stopped the United States mail, and killed some of the emigrants who were, in small parties, endeavoring to reach California from Salt Lake City, I thought it proper to visit them, taking with me "Shoshonee Aleck," the interpreter, my engineers, Messrs. Wagner, Long, and Poor, Mr. Campbell, and the mountaineers Justus, Gabriel, and Williamson. On my way I procured the services of a leading warrior of the Pannack tribe, and by his kindness and discretion I was enabled first to obtain an interview with ten warriors, an outlying party of the band of Po-co-ta-ro or the "White Plume." The leader of these ten warriors told me that he would visit Po-co-ta-ro's camp in the mountains, but that the chief's heart was bad, and that he would listen to soft words from the whites. I sent by this messenger a few small presents to Po-co-ta-ro, inviting him to come to me and have a talk. He came with fifty-five mounted warriors, and treated me and my small party with the utmost respect and consideration. I have to place on record before your department the simple fact that this young chief, known to be hostile to the whites, received me with an attention which I have seldom known manifested by the wild tribes of the interior whom I have repeatedly met, from the very fact that I had thrown myself on his hospitality and kindness, without an escort or a large amount of presents, with full faith in the better attributes of the Indian nature. He said to me his tribe had received what he termed in the Indian language, so far as I reach the interpretation, "assaults of ignominy" from the white emigrants on their way to California; that one of his principal men had had his squaw and his children killed by the emigrants quite recently; that the hearts of his people were very bad against the whites; that there were some things that he could not manage, and among them were the bad thoughts of his young men towards the whites on account of the deeds of the whites towards his tribe. Many of the relatives of his young men had been killed, and nothing but the death of white men could atone for this; nevertheless, I had come to him like a man, and he would meet me like a man; that his father, "Big-um," (referring to Brigham Young, of the Mormon population,) had sent to him many presents, but he knew, for all that, that there was a greater man than Big-um, the Great Father of the whites, before whom Big-um was as a little finger to the whole hand; and much frightened, Big-um, with all his warriors, had run away towards the south when the blue caps, or soldiers, the bands of the White Father, came in sight; therefore, he knew and respected the power of the White Father, and that whenever he should feel certain that the White Father would treat him as well as Big-um did, then he would be the kindest friend to the

Americans that they had ever known. I told this chief that if after the conclusion of the present year I heard good accounts of him and his people, I would endeavor to bring to him full proof of the estimation of the Great Father of the whites, when I came to see him the succeeding season. The whole conclusion of this statement in reference to the western Shoshokos or Snakes is, that either out of a portion of the wagon road appropriation, or by the action of Congress, or from the contingent fund, as in your own view most expedient, a sum of money should be devoted to the purchase of presents to be donated to these Indians on my going into their country, that I may once more visit them and bring home to their uncultivated but stern and true natural minds, the fact that the disposition of this government is not to oppress or harass them, but to gain their confidence and win their friendship towards that nomadic population which must inevitably pass through their tribes on its way to California and Oregon.

The sum of $10,000, covering presents and cost of transportation, would undoubtedly keep these tribes quiet. If no means are furnished, I think the expedition should move as an armed body; and, west of Fort Hall, detached parties never consist of less than twenty men; our side reconnaissances would be very limited, and cost much more than has hitherto been expended on them; and the whole work of next summer be carried on under the embarrassments which must inevitably occur. As to the emigration, the Indians often approach small trains and ask for food or presents, sometimes endeavoring to frighten the emigrants into giving them these articles. The emigrants resist, and often fire upon the Indians. Blood once shed, the next party of emigrants is almost sure to be attacked. During the season of emigration the whole trail is like a travelled highway—thousands of passengers being always on the road. Small parties of one or two men are passing and repassing in search of lost cattle and in visiting trains. They are necessarily very much exposed, and, in event of difficulty, are sure to be cut off, even when the tribes are not at open war with the whites. Should such an arrangement as I have proposed be made with these western Indians, (I refer particularly to both the Oregon and California roads,) as has been made with the Sioux and Cheyennes, it would prevent the recurrence of these difficulties in some measure, because the older men of the tribes would impress upon the young warriors the fact that the "Great Father" had paid for the passage of the emigration through their country. The tribes to which I refer are in eastern aud northern Utah and southern Oregon.*

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* I learn with great solicitude from the letter of a correspondent in Salt Lake City that diffiulty is apprehended with the Loose Creek or western band of Shoshonees These Indians, as have stated in my report, are not under the direction of Wash-i-kee. The leading chiefs mongst them have a jealousy of him. They are more properly termed the Sho-sho-kod r Digger Indians. They are the Indians visited by me with a small party. They were isited after their attack upon trains and after robbing the mails. Their good faith and indness were manifested by the first tribe or band sending runners the whole length of umboldt valley, a distance of 400 miles, in order that thirteen of my men, unprotected d imperfectly armed, might, on their arrival, be passed through the various bands of is tribe in safety to Honey Lake valley, the country of the western Utes. Now that the ormon war is over, and this new road is constructed, saving to emigration the tolls of the

Report of Superintendent James B. Leach upon the El Paso and Fo Yuma wagon road, constructed under the direction of the Departme of the Interior, 1857–'58.

DECATUR, *Illinois, April* 13, 1858.

SIR: I left Washington, as ordered by the Secretary of the Interior, on the 5th day of February last, and proceeded with all possible despatch to the camp on the Cottonwood, Minnesota Territory, the winte quarter's of Superintendent Nobles. I found the men left in charg in fine health and spirits, the stock in good condition and improvin Upon my arrival at camp and learning the condition of things, I pai off and discharged all of the hands there except three, whom I left i charge of stock, &c. Upon making a neat calculation I found I had no sufficient funds in my hands to pay off the whole party, so I paid i full those who were discharged, leaving those unpaid who were left i charge of the camp, as also the chief engineer, Samuel A. Medary, and one James Gorman, who had left the camp a few days before my arrival. My vouchers, showing to whom and amount paid, I sent t Superintendent Nobles for his approval, together with account curren and abstract, which I presume he has handed to you.

Hoping that you may find all correct, I am, sir, very respectfully, your obedient servant,

J. R. GOVIN,
Disbursing Agent, &c.

ALBERT H. CAMPBELL,
General Superintendent, &c.

WASHINGTON, D. C., *January* 29, 1859.

SIR: I have the honor to submit the accompanying papers relativ to the operations of the El Paso and Fort Yuma wagon road, consisting of an itinerary of the movements of the commission, describin

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ferries and bridges, and the passage of the alkali plains, with their deleterious waters, th South Pass route will be thronged as it always has been by emigrants seeking a passage t California and Oregon. Should any difficulty occur with these Indians, who can easily b held in check or managed by the disbursement of a few thousand dollars worth of presents any difficulty from the mismanagement of agents who are not disposed to take the risk o going among them with small parties, meeting them at their own camp fires, smoking th pipe of peace with them, and gaining their confidence, or by military men acting unde false impressions gained from those who are sometimes disposed to create Indian wars fo the purposes of speculation, I shall feel that the exposure, immediately after these outrage were reported to me, of my own life and the lives of the few excellent men who accompanied me in my visit to this tribe, has been a foolish and useless risk. I made these Indian some few presents, all that I had at that time, as tokens of good will. They made m presents in return of equal value. I cannot but believe, should information reach you department conflicting with the views which I have expressed, that there is some misunderstanding which can readily be adjusted; and I offer my services in any direction which yo may think it proper to order me on my return to the mountains, to prevent difficultie between the white men and the Indians on the emigrant route. I will take any personal risk which can well be imagined to prove my full faith in the candor and honesty of th Indians west of the Wahsatch mountains, when properly approached and made fully t understand the objects and the designs of this government.

the country as passed over, and length of marches, camping places, daily incidents, &c.; as also the report of the engineer of the road and accompanying maps.

Receiving my commission as superintendent of the road on the 22d of April, 1857, I was actively engaged for the ensuing two months in procuring the necessary supplies of wagons, animals, provisions, &c., and on the first of July following, the train left the Mississippi river opposite Memphis, Tennessee, en route for the initial point of the road at El Paso, Texas; passed through the central portion of Arkansas, the Cherokee and Choctaw nations; crossed Red river at Preston, and then by way of Forts Belknap and Chadbourne, through the northern portion of Texas to the Horsehead crossing of the Rio Peras; thence by way of Fort Davis to the Rio Grande, reaching El Paso on the 22d of October, 1857.

Working parties were immediately placed in the field and the improvements of the road, continuously carried on, were completed on the 1st of October, 1858.

During the summer of 1858 such portions of the outfit as were no longer necessary were disposed of in the valley of the Mesilla, and the remainder, after being carried to Fort Yuma in the execution of the work, was transported to San Diego, California, and there disposed of at auction on the 17th of October, 1858.

I would respectfully call the attention of the department to the estimate made by the chief engineer of the road in his report respecting the building of a bridge across the Rio Grande, and the lining of the tanks already made, in order to preserve them and make permanent the work already done. For this purpose a small appropriation added to the balance remaining unspent of the former one would be sufficient, and the carrying out of this project would be of immense service to the Mesilla valley, as also to the road, as it would insure a safe crossing on the Rio Grande at all seasons of the year, and impede the destruction of the tanks if not lined with something more substantial than clay.

I would also most respectfully recommend the establishment of a military post on the Rio San Pedro, somewhere about the mouth of the ——— cañon, as the valley must in a short time become a home for the farmer, and the main thoroughfare for the emigrant to California.

The affairs of the commission in Califarnia being arranged, I left San Francisco on the 20th of November, and reported myself in Washington on the 15th of December following. All of which is respectfully submitted.

I have the honor to be, your obedient servant,

JAMES B. LEACH,

Sup't El Paso and Fort Yuma Wagon Road Expedition.

Hon. Jacob Thompson,
Secretary of the Interior.

The El Paso and Fort Yuma wagon road being now completed, it may be necessary to make some remarks concerning the route not contained in the itinerary.

The whole line of road from El Paso to the Rio Gila, with very few exceptions, may be considered a plane level road; and the country through which it runs affords at almost every stopping place an abundant supply of wood for cooking purposes; good grazing is also plenty, and water may be counted on throughout the year to such an extent and at distances so arranged that the emigrant can never know the privation of that necessary.

In these particulars it shows its superiority over all the other roads to the Pacific, particularly for those who travel in large parties and take stock on with them. It may be well to observe that the best times to travel from El Paso to Fort Yuma are the months of September, October, and November, particularly for the farmer from the north and northwest, as he would be enabled to raise a crop at home previous to starting, and be able to arrive in California in sufficient time to raise his spring crop there; at the same time allowing himself sufficient time to recruit either on the Rio Grande or on the Mimbres, at either of which places he is always sure of a sufficiency of good water and grazing. These months are also the best, owing the mildness of the weather, which cannot be surpassed on any other road in the United States, an advantage which is not to be despised, and cannot fail to be fully appreciated by the emigrant.

There is no fear to be entertained from Indians on this route, as the Apaches and Mescahros are peacably inclined towards Americans, in fact I know of no instance since my first operations on the road where Americans have been molested by the Indians. On the contrary, on several occasions they have been aided by them and supplied with provisions, all which goes to prove the advantage which this road possesses over all others for the emigrant.

On the Rio Gila grass is scarce, but in the months alluded to above, there is a sufficiency for any regular sized train, and an abundance of water.

It may be well to observe that although the Indians along the road are friendly to Americans and will not openly molest them, still a great deal of caution is necessary to prevent their stealing anything they may find hanging around camp, as they are very cunning and expert in petty thieving as well as on a large scale.

The same observations will hold good respecting the Pimo and Maricopa Indians; all that is necessary is care and caution, and all will go well.

JAMES B. LEACH,
Superintendent.

EL PASO AND FORT YUMA WAGON ROAD.

Report of N. H. Hutton, engineer, to James B. Leach, superintendent.

WASHINGTON, D. C , *January* 29, 1859.

SIR: I have the honor to submit the following hurried report upon the improvements effected in grade, alignment, &c., on the route of the wagon road from El Paso, Texas, to Fort Yuma, California; together with a few suggestions as to future improvements, and a brief memoir of the country passed through.

The region of country traversed by this route lies almost entirely within that territory recently acquired from Mexico and termed the "Gadsden Purchase," which, previous to the construction of the present wagon road, was traversed by a route opened at different periods by the parties of Colonel Cook, Messrs. Nugent and Hayes, the Mexican Boundary Commission, and Lieutenant J. G. Parke, United States Topographical Engineers. This route, opened as it was by different parties, with different objects in view, and merely "in transitu," could hardly be expected to have been either located on the most direct lines, or to have received much improvement of surface or in facilities for obtaining water. Particular attention was, therefore, given on the new road to such a location as would increase not only its directness, but the facilities for obtaining wood, water, and grass; without which no route, however level in surface or direct in alignment, could be made available for emigration.

The old road, leaving El Paso at the lower end of the "Gorge of the Rio Grande," passed, for seven (7) miles, through these narrows over the rolling rocky spurs of the Organ mountains, and debouching thence proceeded up the wide valley of the river, over an elevated bottom, well timbered and with light clay and sand soil. Crossing near Fort Fillmore to the right bank of the river, it passed through the town of La Mesilla, and thence over a low, rich, well cultivated bottom to the village of the Picacho, where it ascended the bounding "mesa" of the river by a steep rocky hill and turned its course toward Cook's Spring, passing over an elevated plateau region having a fine gravelly surface, covered in places with small fragments of porphyry and basalt, and which is traversed by three low volcanic ranges of hills, the wide open passes of which, however, offered but slight impediment to the passage of loaded wagons. This plateau ceasing within twelve (12) miles of the spring, tne road descended, with an easy grade, into a low, flat, plain with a red clay and loam soil, sloping southward and extending westward to Cook's spring, (situated amid the foot hills of the western slope of the Mimbres mountains.)

Leaving this spring the road ascended a long, narrow valley, a distance of about one and a half mile, and crossing the Mimbres mountains by a favorable pass descended over a rolling slope to the Mimbres river, crossing it by a ford; and thence over a gradually ascending plain, with a firm clay and gravel surface, to the "Ojo la Vaca," (situated in a low basin, on a rolling plateau, and surrounded by small conical hills, forming a peculiar feature in the landscape.)

Leaving this spring (or collection of springs) the old road made a series of rather useless bends toward the Burro cañon, passing over a rolling surface with a loose, light soil of red clay, sand, and gravel, and crossed the latter cañon, with a light descending and ascending grade, five miles south of the Ojo de Ynez; thence, passing over the long rolling slopes from the mountains on the north, it turned the southern terminal spurs of the Burro mountains, descended over a wide, gently sloping plain to the centre of the large basin called the "Valley of the Playas;" ascended an equally gradual slope, and crossing over a low gap in the extreme northern end of the "Pyramid Range," traversed a similar basin to the former one, and called the "Valley of the Lagunas;" and thence through a low pass crossed the Piloncillo range of mountains.

Between the points just mentioned, that is, between El Paso and the Piloncillo Pass, a distance of one hundred and eighty-four and eight tenth (184.8) miles, but one other general route presented itself as having any natural superiority to the old road above described. This route follows the line indicated as the railroad route on Lieutenant Parke's map. Leaving the Rio Grande, immediately in rear of the town of La Mesilla, it follows nearly a due west line, passing up a long trough or valley through the Florida Pass, and thence over the rim of the basin of the Valley of the Playas, and on to the Piloncillo Pass, without crossing a single range of hills or protrusions above the plain surface between the summit of the mesa, near the Rio Grande, and the foot of the Piloncillo Pass.

This route was thoroughly examined, and, though possessing undoubted superiority in grade and distance, was finally abandoned, for the reason that the obtaining a sufficient supply of water, though possible, was not within the limits of the instructions with regard to a proportional expenditure of appropriation, and, in consequence, the old road was mainly followed to the Piloncillo Pass; the exceptions being: Firstly, through the gorge of the Rio Grande for seven miles above El Paso, where, by a change of location nearer to the river bank, several objectionable hills were avoided, and a saving made in distance of about three-quarters of a mile; secondly, the ascent to the table lands near the village of the Picacho, where, by ascending a narrow arroyo nearer to the peak of the same name, a very steep rocky hill was avoided; thirdly, the road from the western foot of the Mimbres mountains to Ojo la Vaca, where a new location was made, leaving the old road three and a half miles west of Cook's spring, thence on an air line for Ojo la Vaca, crossing the Mimbres four miles below (south of) the old road, and saving eight miles in distance; fourthly, the straightening of several useless bends between the Ojo la Vaca and the Ojo Excavada, and between the latter point and the southern terminal spurs of the Burro mountains.

The improvement effected by these changes of location, between El Paso and the Piloncillo Pass, amount to a saving in distance of twelve miles and a half, (12.5.)

With regard to the route from the Piloncillo Pass westward, the instructions from the department were, if possible, to construct the road through Parke's Railroad Pass; thence down the Playa de los Pimos, and Arrivaypa valleys to the San Pedro, and down the latter to the Gila; this last, of course, being then followed to its junction with the Colorado—thus effecting a great saving of distance over any other possible route, and securing the greatest combination of directness, wood, water, and grass that the territory afforded. If this was not found practicable, it then devolved upon the persons in charge to select such a route as they might deem most favorable.

In pursuance of these instructions, careful and thorough explorations were made of the Arrivaypa cañon and creek; of all the available passes through the San Calisto mountains between the Playa de los Pimos and the San Pedro; of the valley of the Gila from the mouth of the San Pedro down to the Pimo villages; and of the region of country lying between the Gila and San Pedro rivers below their junction.

The Arrivaypa valley, for about twelve (12) miles of its length, was found to cañon in such a manner as to forbid the construction of a wagon road through it, though the obstacles would not be such as to prove it impracticable for a railroad.

The valley of the Gila below the mouth of the San Pedro was found to present expensive obstacles to a wagon road in the form of rocky spurs, abutting closely on the river banks, besides being a considerable increase in distance over an economically practicable and almost air line between the mouth of the Arrivaypa and a point on the Gila just below its debouchment from the last cañon of the upper Gila.

The valley of the San Pedro having been found practicable, the following location was adopted from the western end of the Piloncillo Pass:

Leaving the old road at the western foot of the mountains the line proceeds nearly west over a gradually sloping plain, with a clay and gravel surface, to the Rio San Domingo, (or Sauz,) crossing this stream about three miles below the old road, and where it has a width of about three (3) feet and an average depth of eight (8) inches; thence over a gradually ascending plain, with a firm surface, generally of reddish clay, to the Sycamore spring about three miles east of the summit of Parke's Railroad Pass, and situated near the base of the foot hills of the Chiricahui mountains; thence over a rolling surface, across the long sloping spurs of the before mentioned mountains to the wide, open divide of the Railroad Pass; through this pass, over a gently descending slope, it enters the valley of the Playa de los Pimos, and reaches the Croton springs, situated at the northern end of the main playa. Leaving these springs, the road ascends, with a light grade, a wide plain with a compact clay surface for several miles, and entering a gradually ascending smooth arroyo, it attains the low summit of Nugent's Pass. Thence descending a long, wide, gently sloping water drain, it crosses the main arroyo from Nugent's Pass, running to the San Pedro, and proceeds in a direct line from the summit to the latter stream, crossing an intervening rocky spur from the San Calisto mountains and descending to the San Pedro over a wide, uninterrupted, and sloping plain, intersects that river about thirteen (13) miles below the old road crossing; and thence turning northward, down stream, follows along the right bank of the river to the mouth of the Arrivaypa creek.

On the first twenty miles of the route down the San Pedro river, the narrowness of the valley and the infringing spurs, rendered necessary frequent side hill locations, though no hills were encountered offering very serious obstacles to a reduction of grade. The soil was generally a loose clay and gravel, or cobble stones, easy of removal, preserving its stability with steep side slopes, and consolidating readily and firmly in embankment. Below, in the remaining thirty miles of the river valley, the principal obstacle to the opening of the road was found to be heavy mesquit timber and brush.

Opposite the mouth of the Arrivaypa creek, the road crosses the San Pedro, having a width of twelve feet and flowing in a clear stream about eight inches deep over a pebbly bottom. Leaving the San Pedro, the road ascends a large arroyo or water drain, three miles to a spring, where it turns to the right up a branch valley, having a gradually ascending slope, with a light clay and sand surface, to the divide of the Santa Catarina, between the waters of the San Pedro and those flowing into the Gila river. Passing for several miles over the gently rolling surface of this high divide, it then enters a long drain descending to the Gila; follows it with a gentle slope to within eight miles of that river to another spring, and, thence turning to the left, ascends the bounding mesa of the arroyo and proceeds toward the Gila river over a gradually descending plain, with a firm surface of red clay and fine gravel, intersecting the river fifteen and six-tenth miles above the old road from Tucson, and proceeding thence down the left bank of the stream to the Maricopa wells, over the elevated bottom lands of the river. Thence crossing the "Little Desert," the line of the old road is followed generally, the only exceptions being in the ascents to two or three of the table lands passed over, and the avoidance of one or two others, together with the straightening of several useless bends; all changes being minor in themselves, but forming a very important aggregate to the traveller over this portion of the route.

By this change of location between the Piloncillo Pass and the Pimos villages on the Gila, a saving in distance was effected of thirty-five and one-tenth (35.1) miles; an increase of over seventy (70) miles along running water made, and the second best valley of the territory opened to the inspection of the emigrant, who otherwise might have passed through the country without dreaming of its existence. The entire amount of saving effected in distance, by the new location, between El Paso and Fort Yuma, is forty-seven and sixty-four-hundredths (47.64) miles.

The improvements effected upon the line of location consist of two kinds: the improvement of surface and the reduction of grades, and the increase and improvement of watering places. I would preface my remarks upon this subject by stating that the road, in excavation and embankment, was constructed with a width of eighteen (18) feet on straight lines, and twenty-five (25) feet on curves, and in all clearings of timber, brush, and rock, was opened to a uniform width of twenty-five (25) feet, allowing ample room for the management of ten mule teams, in common use in that country.

The improvements, both as to grade and watering facilities will be taken up as they occur upon the road from El Paso going west.

Through the gorge of the Rio Grande for about seven (7) miles the road was constructed by side hill cuttings and embankment, along and around the ends of the spurs on the left bank, requiring the excavation of 5,330 cubic yards of earth, which was deposited in embankment, forming half the width of roadway, and 3,900 cubic yards of rock, which was principally employed in forming the embankment and retaining wall on a short curve about three miles above El Paso. The earth excavated consisted of a compact clay and gravel, frequently requiring blasting for its economical removal, and the rock (which was encountered at only one point) was a hard metamorphic conglomerate. By the execution of this work all the hills of the gorge, with one exception, were avoided, and this one, having an ascending grade of about 1′ in 10′, and one descending of 1′ in 20′, was freed from all loose rock and stones, levelled up, and drained, materially reducing the labor of its transit.

Next in order is the road between Mesilla and the village of the Picacho, (the point of departure of the road from the Rio Grande valley.) The line here follows up the valley for six (6) miles through a low, rich bottom, thickly studded with cornfields and intersected by numerous ascequias or irrigating canals. To avoid the injurious effects of rain and the frequent overflowing of the ascequias on the heavy loam along this portion of the route, it was found necessary for about three (3) miles to isolate the road bed by ditches on either side, and to raise the surface by the material thus excavated; also to construct bridges over five of the ascequias, all requiring embanked approaches, from the fact that the water to be crossed is always higher than the surrounding country. These bridges were of the simplest description, having from eight to ten feet span, and consisting of cottonwood logs (obtained along the river bank) as stringers, and similar smaller ones as cross pieces, the whole being covered with a layer of earth eight inches deep. The entire amount of earth excavated on this section of the road was about ten thousand (10,000) cubic yards of a black loam and sand intermixed, quite moist, and difficult to work from its tenacity.

The arroyo, along the base of the Picacho, leading to the table lands, was the next point improved. The work consisted principally of very light side-hill cuttings and a clearance of loose rock from the road, which was not measured. The results obtained were a shorter ascent to the "mesa" and the avoidance of a very steep incline of rock on the old road. In addition to this road, by way of the Picacho, another was improved which ascended the mesa directly west of La Mesilla, and striking for the pass in the former road through the first range of hills west of the river, proceeding over a gently undulating and grass covered plain, with a loose red clay and sand soil, intersecting the first road at the above mentioned pass, twelve (12) miles from the Picacho. The work upon this route consisted of the ditching of the road bed in two low places, each about fifty yards long, and the bridging of two large ascequias, effecting by this route a saving of three (3) miles in distance between La Mesilla and Cook's spring.

About twenty-five miles from the Picacho the road ascends to a more elevated plateau, passing up a short arroyo and ascending the side of a spur to the level above. The work at this point consisted of a side-hill cut for one hundred yards through a white clay, intermixed with fragments of quartz and basalt, rendering the ascent straight and gradual, in place of the former, which was curved and very steep, and which passed directly up and over the summit of the spur.

One mile west of this cañon was constructed a reservoir, consisting of a dam of stone and earth across an arroyo, (showing evidences of a somewhat extensive drainage.) The bed rock was exposed, and cleared off on the bottom and sides of the dam, having a top and bottom width of thirty feet and depth at sides of ten (10) feet, the slope of the arroyo being about 1′ in 5′. The dam was constructed of a stone wall (dry laid) thirty (30) feet long, ten (10) feet high, and three and a half (3½) feet thick, backed with loose earth and stone, sloping 4′ to 1′, forming a pool of about forty thousand (40,000) gallons capacity.

Between this reservoir and the break of the plateau, (twelve miles east of Cook's spring,) the work consisted of the removal of a quantity of loose basaltic fragments from the roadway. At the eastern edge of the low plain, lying between this plateau and Cook's spring, a well six (6) feet in diameter and seventeen (17) feet deep was constructed; and two tanks, each seventy (70) feet long, nine (9) feet wide, and four (4) feet deep, sloping 3′ to 1′, having a united capacity of sixteen thousand three hundred and sixty-two (16,362) gallons. The material excavated consisted of a compact red clay; and basaltic bed-rock was encountered at the bottom of the well.

Twelve miles west, at Cook's spring, two tanks were constructed receiving the surplus drainage from the spring, each having a length of fifty (50) feet, depth of five (5) feet, and width of ten (10) feet, sloping 2′ to 1′, having a united capacity of twenty-six thousand eight hundred and ninety-two (26,892) gallons. The material excavated was a moist black loam and clay; sand underlying at a depth of six feet.

On the ascent to the summit of the Mimbres mountains, the work along the arroyo consisted of very light side-hill cuttings near the summit; on the descent it was principally the removal from the roadway of numerous large porphyritic fragments, which formerly rendered the descent of the hill-side both difficult and dangerous to loaded wagons. Minor improvements were also made in leading the road down the arroyo, draining toward the Mimbres river.

Along the new route to the Mimbres no work was necessary beyond driving our wagons over it to render the surface well marked and compact.

At the Ojo la Vaca (which is a collection of springs welling up from a marshy mass in the centre of a small basin situated on an elevated rolling plateau) a drainage trench was excavated, forming a water trough, surrounding the centre of the basin, from whence the waters of the spring proceed, having a capacity of ten thousand six hundred and ninety-two (10,692) gallons; and several smaller ones, along the sides of the basin, for the purpose of obtaining drinking water, uncontaminated by stock, &c.

Between this point and Ojo Excavado the work consisted of the marking of the new road and the removal of loose stones from the road way for about three (3) miles east of the last mentioned spring.

The Ojo Excavado, situated under the western slope of Cook's mountain, is the outbreak of the water draining from this spur of the Burro mountains, bounding the cañon of same name, and issues from the rents of a porphyritic upheaval. The only improvement of the watering facilities, possible at this point, was the clearance from between the bed-rock of the superincumbent clay and gravel. The work executed consisted of the excavation of a hemispherical reservoir, having a diameter of twenty (20) feet and depth of five and a half (5½) feet in the centre, receiving the waters of the spring in the bottom, and having a capacity of five thousand five hundred and eight (5,508) gallons.

For three miles west of this spring, the road being on a new location, required the removal from the surface of a quantity of small volcanic fragments which overlie the soil near the foot slopes of all the hills in this region of country.

The centre of the "Valley of the Playas" next claims our attention. At this point was constructed a tank one hundred (100) feet long, six (6) feet deep, and twenty (20) feet wide, sloping on the western side 3′ to 1′, and a slant well sixteen and a half (16½) feet in diameter at the top, five and a half (5½) feet at the bottom, having a depth of thirteen and a half (13½) feet, so located as to receive the surplus water from the tank draining down from the south, the two having a united capacity of one hundred and fourteen thousand five hundred and thirty-four (114,534) gallons. The soil encountered in the excavation of the tank was a compact yellow and red clay; and the same for the same depth in the well; below that thin layers of sand were found, about four inches in width and three feet apart. The soil at the bottom of the well was a very compact red clay.

The next point improved was the basin of the "Valley of the Lagunas," in the centre of which was sunk a slant well to receive the drainage from the basin, having a diameter at top of twenty (20) feet, at bottom of eight and a half (8½) feet, and a depth of thirteen and a half (13½) feet, with a capacity of fourteen thousand and ninety-four (14,094) gallons. The soil encountered for a depth of ten (10) feet, was a very compact red clay, intersected by layers of sand about four inches in thickness, and about three feet apart, thence downward the excavation was through a tenacious white clay.

Twelve miles west of this point at the descent of the pass through the Piloncillo range, a side-hill cutting was made, about one hundred (100) yards long, and all short turns were widened, requiring the excavation of one hundred and fifty (150) cubic yards of earth, and ten (10) cubic yards of rock; the roadway for fourteen (14) miles to the Rio San Domingo was cleared of brush and loose stones.

At the crossing of the latter stream a pool was formed by a trench and dam on the lower side; the trench being perpendicular to the course of the stream, one hundred (100) feet long, four (4) feet deep, and seven (7) feet wide at bottom, sloping on the upper side 3′ to 1′; the material excavated being deposited in embankment on the lower side, forming a water raise of six (6) feet, with a pool forty (40) feet long, having a capacity of about seventy thousand (70,000) gallons. The soil was a mixture of yellow clay and loam, overlying sand, which was only penetrated by a test pit.

Sycamore spring, three miles east of the summit of the Railroad Pass, was the next point where any improvement was found necessary. Here the water percolates through a stratum of sand and gravel from the Chuicahui mountains, and formerly in dry seasons, was only exposed at a break in the stratum in the shape of a round hole of water about six inches deep and three feet in diameter. Commencing above this point, a trench was sunk parallel with the direction of the water drain, forty-eight (48) feet long, twenty (20) feet wide at top, four and a half (4½) feet at bottom, and eight (8) feet deep; passing through the layer of sand, gravel, and cobble stones containing the water, to a compact red clay beneath ; piercing this four (4) feet in depth, and forming a basin for the reception of the water draining down through the pervious strata above; having a capacity of thirteen thousand four hundred and forty-six (13,446) gallons, with a sufficient discharge from the spring to fill it three or four times in twenty-four hours.

The passage of the spur of the San Calisto mountains crossed in reaching the San Pedro, was the next point needing work, which consisted of the removal from the roadway of a large quantity of loose fragments of volcanic rock, which encumbered the ascent for about one half mile. Thence descending the San Pedro, the first twenty (20) miles required a considerable amount of work in the passage of the summits of low spurs, and the side locations around their points when practicable. These hills were generally composed of metamorphic sandstone, overlaid with red clay and gravel, through which latter material all the excavations were made. In the construction of the road ten thousand (10,000) cubic yards of material were removed along this section, leaving a broad, firm roadway, offering no obstructions to the passage of heavily loaded wagons.

Below this section the valley increases in size to a width between foothills of about two and a half miles, and the only work necessary upon the road was the clearing and grubbing through occasional heavy groves of mezquit timber, there being a total of five (5) miles of this clearing along the lower portion of the route, exclusive of small timber and brush, which was encountered at nearly every mile for twenty-five (25) miles in distance.

Between the crossing of the San Pedro and the intersection of the road with the Gila river the road passes over an elevated plateau, studded with isolated peaks, forming the northern terminal spurs of or the Santa Catarina range, which here breaks up and lowers its water shed, leaving a passage of about ten miles in width, rising again in rugged mountains along the banks of the Gila. The rise on both sides is gradual, and the surface compact red clay, overlaid in places with gravel and fragments of volcanic rock. Little or no work was necessary, except the clearing away of stunted mezquit and brush in the arroyo ascending from the San Pedro, and in the one descending to the Gila, which is followed to within eight miles of its junction with that river.

Descending the Gila the first work found necessary and executed was the passage of the road through a low range of hills on the western slope of the "Little Desert," below the Maricopa wells, which consisted of light side-hill cuttings, avoiding the short curves on the rolling ground, crossed near the summit. About the middle of the plain a well was sunk thirty (30) feet deep through sand and clay, but no water was obtained. Thence down the river the old road crossed seven mesas or low table lands, which run in from the south, with an average height of about ninety feet, an abut closely on the river bank or on lagoons branching from the river. Their sides and a portion of their summits are uniformly covered to a depth of two or three feet with an agglomeration of large black basaltic blocks, rendering the passage of these table lands a matter of serious inconvenience to loaded wagons, rather from the roughness of their surfaces than the increase of grade.

The roadway over six of these (in the first place much improved by the location of new ascents,) was entirely freed from rock to a width of twenty-five (25) feet, and the material walled up on either side two or three feet high; thus preventing other obstructions from being rolled by rains, &c., into the roadway, and serving as protecting drains on the upper side. One of the mesas was entirely avoided; about ten (10) miles of new road was cleared and opened to a width of twenty-five (25) feet; the bad sand-hill near Antelope Peak, sixty (60) feet long was paved with cobble-stones, and the summit reduced by a cutting five (5) feet in depth and ten (10) feet long. The topography of the valley and the location of the old road prevented the necessity for any very heavy work on this part of the route, but from the improvement of surface consequent upon our labors (I am informed by freighters over the road,) two days' time is saved by loaded wagons between the Maricopa wells and Fort Yuma.

On reviewing the improvements effected by this line of location, and the labor performed upon it, it will be found that there is a saving of distance between El Paso and Fort Yuma of a little over forty-seven (47) miles; (two good days' travel for an emigrant,) and from the fact that the improvement of surface alone on the Gila river, by the mere diminution of friction, in passing loads over the road has has made a saving of two days' time, we may safely estimate the entire saving of time effected by our improvements at five travelling days, in addition there is an increase of over seventy (70) miles along running water; the formation of six new watering places, reducing the greatest distance between camps to twenty-seven (27) miles; a reduction of all grades to a slope, easily ascended by teams drawing maximum loads, which for six mules is 4,000 pounds, and for ten mules about 6,000 pounds; and the opening to settlers and emigrants of the rich valleys of the San Pedro and Gila rivers.

I will now proceed to such a brief description of the country as I deem necessary to a proper appreciation of its merits and capacities; though such elaborate and able topographical descriptions of it have been written by Captain Pope and Lieutenant Parke in their railroad reports, that it will be unnecessary for me to do more than call attention to the fact of the existence of certain topographical features, favorable to settlement and cultivation, and offering corresponding advantages for the operation of either a rail or wagon road from ocean to ocean.

The districts contained in this description will embrace only such portions of the country as are along or adjacent to the line of the wagon road, and such as were examined by parties connected therewith. The arable land found throughout this country lies entirely within the valleys of streams, and is only of such width as can be irrigated from the water course, except some portions of the lower San Pedro, and portions of the Santa Cruz valley and its tributaries. The mesas or table lands are uniformly covered with an abundance of grass, and near all watering places offer advantages for stock raising. The valleys are five in number, all containing enough timber for purposes of settlement, and having an aggregate of arable land of about three hundred thousand acres, in so far as cultivated producing unusually large crops.

Proceeding from El Paso westward, the first in order is "the valley of the Rio Grande."

This valley, traversed by the road for fifty-one (51) miles, may be considered the most important in the Territory. Above the gorge of the river—that is, from Frontera to Doña Ana—the valley varies in width from five to fifteen miles, bounded on the eastern side by the long sandy slopes of the Organ mountains, and on the western side by a low mesa, extending far westward. The banks of the river are well timbered with cottonwood, and though the grass in the immediate bottom is coarse, yet the hill slopes furnish an abundance of most excellent gama. The soil is rich and productive for a width varying from three-quarters of a mile to three miles on either side of the river. It is now cultivated with great success for about twenty (20) miles in length and three (3) in width along that portion of the western bank of the river called La Mesilla valley, and also on the opposite bank, in the vicinity of Las Cruces and Doña Ana.

The principal settlements along this portion of the valley are the towns of El Paso, Mesilla, Las Cruces and suburbs, and Doña Ana. The entire population of these places is about ten thousand (10,000,) and the total amount of arable land between Frontera and Doña Ana I estimate at eighty thousand (80,000) acres.

The next valley going west is that of the Mimbres river. Between the Rio Grande and this valley (sixty miles) the country is an elevated plateau, crossed by two low ranges of volcanic hills and the Mimbres mountains, which form the eastern boundary of the valley of the same name, and terminate about twelve miles south of the road crossing. The whole region is covered with a luxuriant growth of gama, but offers no points for settlement except near Cook's spring, where the land lying near the spring and in the valley extending south from it offers advantages for establishing stock ranches.

The Mimbres, rising about the parallel of 33°, flows southwardly for seventy miles, and sinks in the sandy plain lying between the Florida and Mimbres mountains. The stream, where crossed by the road during the time our parties were in the field, had a width of about ninety (90) feet, and an average depth of one and half ($1\frac{1}{2}$) feet, and was discharging by measurement three thousand and thirty (3,030) gallons per *second*. It was also gauged at a point four miles above at the old road crossing during the month of November, 1857, and was then discharging twenty thousand four hundred and twenty (20,420) gallons per *minute*, forming a clear mountain torrent, flowing over a wide pebbly bed with low flat banks, extending back to the long gentle slopes of the Mimbres mountains on the east, and those from near Ojo la Vaca on the west. From the head of this stream to a point six or seven miles above the road crossing the valley is said to be narrow and well defined, and during its passage of the mountains has a fine bottom land and most excellent timber. The extent of arable land is estimated at twelve thousand (12,000) acres.

The "San Pedro valley" is the next in importance to the Rio Grande, and with the tributaries on its east (the Arrivaypa) offers an extensive region for cultivation. The road passes down it for a distance of fifty-one (51) miles, from the point of the Sierra Colorado to the mouth of the Arrivaypa. Along the first twenty miles, descending, the valley is not more than one-fourth of a mile in width, bounded on either side by sloping grass-covered terraces from the San Calisto and Santa Catarina mountains, its banks fringed with a growth of cottonwood and ash. Below it opens out, having a varying width between foot hills of from three-fourths of a mile to three miles, with broad rich meadows and well timbered banks, the gradually sloping hill-sides covered with a luxuriant growth of gama and other grasses, and the more elevated slopes densely timbered with mezquit. During its course it receives three tributaries from the Santa Catarina range, which were not explored, but from their well timbered appearance must be of some importance. I should estimate the amount of arable land of this lying along the wagon route at about fifteen thousand (15,000) acres. The San Pedro, at the first point reached in the present road, has a width of about twelve (12) feet, and depth of twelve (12) inches, flowing between clay banks ten or twelve feet deep, but below it widens out, and from beaver dams and other obstructions overflows a large extent of bottom land, forming marshes densely timbered with cottonwood and ash, thus forcing the road over and around the sides of the impinging spurs. This stream is not continuous all the year, but in the months of August and September disappears in several places, rising again, however, clear and limpid.

Fifteen miles above the mouth of the San Pedro, and where the road crosses it, going west, it receives the "Arrivaypa." This stream rises in the wide valley north of the Playa de los Pimos, and breaking through the San Calisto mountains, empties into the San Pedro. The valley was ascended for twenty-five miles, to the head of permanent water; for five miles from its mouth the valley was about one mile wide, and timbered along the river bank with cottonwood, sycamore, and ash; the bed of the creek was about twenty feet wide, and dry except during the rainy season. Thence entering the foot hill of the San Calisto mountains, the valley winds its way between high gravelly mesas, having a width of from one-fourth of a mile to on mile, and gradually narrowing, passes through a range of mountain ten miles in width, and rising from one to five hundred feet above th stream, forming, in many cases, a cañon not over thirty feet in width, with perpendicular walls of basalt. In the bends of the creek, through the cañon, however, several small patches of rich bottom land are found, which furnish a dense growth of large sized ash, sycamore, iron, and cottonwood timber. Above this cañon the valley increases in size to a general width of three-quarters of a mile, gradually merging into the wide valley leading to the Playa de los Pimos. Five miles above the gorge the source of permanent water is reached, being a large marsh, or lagoon, from which a small stream, in many thread-like branches, winds off toward the mountains, and after uniting burst through to the San Pedro, hardly ever reaching above ground nearer than five miles from the river. The valley for the last named distance, on the upper end, has been and now is cultivated by Indians, for a width of one-half or three-quarters of a mile along the stream; their ascequias and cornfields being visible at the time of exploration. Above this marsh permanent water ceases, and a valley from ten to fifteen miles in width extends southward to the Playa de los Pimos, abounding in rich grass, and containing the springs of Dove Côt, Bear, and Lucky Butte, all situated under the foot slopes of the San Calisto mountains on the west. The stream of the Arrivaypa, was found to flow over a gravelly and sometimes rocky bed, having about the volume of the San Pedro, with evidences through the cañon of its rising twenty-five or thirty feet above its level, at time of exploration. About the head of the Arrivaypa there may be about fifteen hundred (1,500) acres of arable land, and three or four thousand in the immediate vicinity of the head springs, forming desirable land for stock raising.

The Gila river between the mouth of the San Pedro and the Pimos villages.

This section of the valley is about seventy-five miles in length, and embraces within it the lowest cañon of the Upper Gila. From the mouth of the San Pedro, for eight miles down stream, and around the junction of the two rivers, the valley of the Gila is about three (3) miles wide, having a strip of low, rich, bottom land, about one mile wide, along the river bank well timbered with cottonwood and willow, and furnishing grass of an excellent quality in abundance. Below this it cañons through an elevated and rugged range of mountains, forming the topographical termination of the Santa Catarina range. Continuing through this for about thirty miles the river has a width of about two hundred (200) yards, with steep, rocky bluffs running down to the water's edge, rendering the passage impossible except by fording the river from one point, or bend, to another. Between the curves of these hills are found occasional patches of bottom land, but quite too small and isolated to be valuable. After breaking through these mountains, the valley expands to a width of two or three miles, bounded on the north by the elevated mesas, sloping down from the ranges to the northward; and on the south by the low, gravelly slopes, running down from the Sierra Tortalita, maintaining its width to the Pimos villages. The valley is elevated and well timbered with mezquit and cottonwood, though grass becomes more scarce, and is of a species called by the Mexicans "galleta."

Between the Pimos villages and the Maricopa wells the entire distance along the left bank of the river is now under cultivation by the Pimo and Maricopa Indians; which land is about three miles in width, lying near the river, and is highly productive. The entire valley between the foot slopes of the hills, on both sides, is about twelve miles in width; the soil, except the flats, being light red clay and sand, strongly impregnated in places with alkaline matter. The slopes of the mesas are generally covered with a coarse sand and gravel, overlaid with fragments of basalt, obsidian, &c. On this section there is about thirty thousand (30,000) acres of arable land.

The Lower Gila, from the Maricopa Wells to Fort Yuma.

This section of the river is one hundred and sixty-nine miles in length, and possesses a considerable amount of land capable of being brought under cultivation. Immediately below the Maricopa wells the river makes a sudden bend to the north, passing through a gorge, an elevated range coming down from the north, and which loses its continuity on a line directly west from the wells. To avoid this detour the road crosses an elevated plateau called the "Little Desert," thirty-nine (39) miles in width, having a firm gravelly surface and being destitute of timber. Thence descending, the valley maintains a width of from five to ten miles, with occasional low table lands with an average height of about ninety (90) feet, running into the river bank, forming in many places narrow gorges, and having between them low flats well timbered along the river with cottonwood and willow, and higher up on the slopes, dense groves of mezquit and acacia. Seven of these little plateaux are crossed between the Little Desert and White's ranch, (a distance of about one hundred and forty miles,) having a width of from three-fourths of a mile to three miles. Below this ranche the river valley is lower and wider, having a large growth of cottonwood and mezquit timber, and is only interrupted in its continuous width by the point of the Big Horn mountains twenty (20) miles above the mouth, which approach closely to the river leaving ample room, however, over gently rolling spurs of gravel and clay for the roadway.

From the point of these mountains a wide plain well timbered with cottonwood, and bounded on the south by a low mesa extends to the junction of the Gila and Colorado rivers. The soil of the mesas and elevated slopes of the Gila valley is a high sandy clay, covered with volcanic fragments, and overlaying friable sandstone, principally metamorphic, producing a scanty growth of gama and galleta grass. Nearer the river and on the lower ground of the bottom the soil is a loose loam and clay, showing frequent evidence of the presence of alkaline matter.

The river along the entire distance followed by the road maintains the same general features, having a wide shallow current flowing over a sandy bed, and between banks averaging six feet in depth. It receives no tributaries from the south, but from the north receives the San Francisco, Mineral and Salinas rivers, each reported to have extensive valleys and a considerable discharge of water. The latter stream being said to empty into the Gila a larger body of water than that river contains above their junction. The entire amount of arable land on the left bank of the Gila from the point where the road strikes it to Fort Yuma, I estimate at one hundred thousand (100,000) acres.

In addition to these well defined valleys having running streams and arable bottom lands, there are two or three large troughs or basins traversed by the road, which form immense valleys bounded by long drawn slopes, abounding in excellent grass but destitute of timber. Of these there are three well defined *basins*, and a fourth, (the valley of the Sauz,) though not a basin, presenting the same general features and only available for the same purposes, which I consider to be stock raising.

The first of these going west is the "Valley of the Playas," lying between the Burro mountains on the east, and the Pyramid range on west. This basin has a general direction of north and south, and a width between foot hills of about fifteen (15) miles, with a length as far as known of about twenty (20) miles. The soil along the side slopes is a red clay and gravel intimately intermixed, and is covered with an abundant growth of gama grass. Along the centre of the trough, running north and south, are a series of bare clay surfaces forming what are called "*playas*," a Spanish term signifying the beaches, but used by them to describe a smooth surface showing evidences of having been covered with water.

Along the surface of these playas, during the rainy season, the water accumulates in wide, shallow lagoons, from two to six inches deep; and it was for the retention and preservation of this water that the well and tank before mentioned were constructed. The fall of rain in this interior district has, I think, been much underrated. I am not sufficiently acquainted with the science of meteorology to determine *why* more rain should fall in these plateaux than would be indicated by a regularly decreasing proportion between the Rio Grande and Fort Yuma; but that such *is* the case I am convinced. During a period of four months, from December, 1857, to March, 1858, a rain-gauge was placed in the centre of this playa, and during this, the dry season, indicated, when removed, an amount of rain equal to a level fall of three (3) inches, besides showing conclusive evidence of a greater fall, which the receiving vessel of gauge would not contain.

"The valley of the Lagunas" is joined at the northern end of the Pyramid range with the former valley, and lies between the Pyramid and Piloncillo ranges. It possesses the same general characteristics, and a parallel direction with the valley of the playas. The drainage, however, is not so uninterrupted, and each small playa appears to drain a distinct section of the valley. A well was sunk in the centre of this valley, where crossed by the road, which received a sufficient quantity of water to fill it, containing over fourteen thousand (14,000) gallons.

The "valley of the Sauz or San Domingo" has a small stream flowing through it, taking its rise in a large cienega or marsh about fifteen miles above the point where crossed by the present road, and at high water, or for about six months in the year, flows towards the Gila, distant about forty (40) miles northwesterly from the road crossing. It has an average width of about three (3) feet, and depth of eignt (8) inches when full within its banks, and winds around in a narrow, tortuous, and, at times, imperceptible bed in the centre of a broad, sloping valley, between the Piloncillo mountains on the east, and the Chiricahui mountains on the west, and gradually expanding, from a width of five miles near the cienega of the same name, attains a width of about eighteen miles where crossed by the road. There is little or no bottom land; the long gravelly slopes from the mountains running in almost unbroken plains to the water's edge, and are destitute of other timber than greasewood and a scattered growth of stunted mezquit. A tank was formed across this stream for the retention of water during the dry season, and I think that water for stock may be obtained by wells of no very great depth. In fact, it is reported that this valley once sustained a numerous population; but I saw no evidences of it, and cannot believe it possible that it ever did or ever will sustain a larger population than the few necessary to guard the stock which could be grazed on the plain.

The "valley of the Playa de los Pimos," lying between the Chiricahui and Pinaleño mountains on the east, and the San Calisto mountains on the west, is another wide valley having no distinct water drain, and so gradually merging into the valley of the Arrivaypa that I consider the whole tract between the crossing of the playa by the present road and the source of the Arrivaypa as one and the same valley. This valley is about fifteen miles in width, bounded by mountains whose slopes are well timbered with cedar, oak, and pine. Several springs are found on either side, offering great inducements for the establishment of stock ranches, the entire valley and the foot hills of the mountains being covered with a luxuriant growth of gama and other grasses. Water could be obtained at no great depth anywhere along the centre line of the valley. Above or south of the present road extends a playa having an exposed clay surface twelve miles long, and about seven wide in the centre, the whole plain being barren and destitute of everything.

The principal points from which timber for building and other purposes can be obtained along the line of road are as follows:

The "Organ mountains," twenty miles from the road, along the Rio Grande.

The "Santa Rita mountains," thirty miles from the crossing of the Mimbres river.

The "Burro mountains," twenty miles from Ojo la Vaca.

The "Santa Catarina mountains," along the San Pedro.

And along the elevated slopes of the Gila valley.

In addition to these sources of supply *near the road*, there is the "Santa Cruz valley" and Santa Rita mountains along its head, both valley and mountains possessing a large quantity of pine and mezquit timber.

According to a communication recently received from Sylvester Mowry, esq., (delegate elect from Arizona,) the arable land of the

Santa Cruz and Sonvita valleys is about one hundred miles in length and two miles in width; wherever cultivated producing *two* abunda crops of grain *annually*, and now having a population, including th miners near Tubac, of about three thousand souls, exclusive of In dians, (many of whom are semi-civilized and cultivate largely,) raisin about twenty-five thousand (25,000) bushels of grain annually. Fro the same gentleman I learn that the last year's crop on the Ri Grande, between El Paso and Doña Ana, was about one hundre thousand (100,000) bushels of grain, besides a large crop of grapes also, that on the Gila there is raised by the Pimo and Maricopa In dians a sufficient amount of corn and wheat to maintain six thousan souls, besides furnishing large amounts to the mail company an travellers; and that below their villages settlers are rapidly coming in.

Thus it will be seen that this country is not entirely a desert; tha besides being a transit for emigrants, it has within itself resourc and capacities for settlement worthy of attention. With its mild, healthful climate, and immense mineral resources, this country mus greatly improve, even without the impetus of a Pacific railroad. As the shortest route across the desert belt of country separating the Atlantic and Pacific coasts, and as the favored route for speed and safety of a large majority of our emigrating population, this road should possess every improvement possible to render it worthy of the interests connected with it and the government from whence the improvements emanate.

In view of these facts, I would respectfully suggest the following further improvements upon the road: Consisting of a bridge acros the Rio Grande, near Frontera; the increase in size, of the tanks now constructed, and their protection and permanency secured by lining them with stone; and the sinking of experimental wells to a depth of from one to two hundred feet, in the basins and valleys passed over.

The bridge would be about six hundred (600) feet span, with rock foundations, and good building stone convenient; costing about $50,000.

The improvement of the tanks, and lining them with stone, will require about $25,000, and the experimental wells about $25,000 more. The two latter items, and particularly the lining of the tanks, I consider of vital importance to the road and Territory. In fact, it is absolutely necessary to the preservation of the work already executed that this should be done; without lining or a constant supervision the tanks will fill up, and the wells cave in; it was not within the means of the former appropriation to perfect them, and should now be done.

The sinking of wells along the valley and basin formations will solve a problem of great importance to this whole region of country, as to whether there is a sufficient amount of rain fall to form subterranean reservoirs.

Also, since it was not possible during the time our parties were in the field, to construct any works for the retention of water on the Mimbres, some provision should be made for the immediate execution of that work.

I append hereto a "table of amount of work executed," showing the kind and quantity, and the increase in water provided for by the tanks, &c.; also an incomplete "table of temperatures," taken during the hurry of exploration, but which may serve to show the extreme mildness of the winter along the route; a "meteorological record at Fort Fillmore, on the Rio Grande," kindly furnished me by Dr. G. E. Cooper, United States army, and a "table of distances," accompanied by "a few practical hints to emigrants."

I have to express my obligations to G. C. Wharton, civil engineer, and Messrs. Hume and Cress, assistants, for their valuable services during the prosecution of the work.

Accompanying this report you will find the maps, drawn on a scale of one six-hundred-thousandth, ($\frac{1}{600000}$,) representing in two divisions the line of road from El Paso to Fort Yuma. The notes upon the maps will sufficiently explain them. Hoping that, if possible, more time may be allowed me for a revision of this report,

I remain, very respectfully, your obedient servant,

N. H. HUTTON,
Engineer of Road.

JAMES B. LEACH, Esq., *Superintendent.*

Construction. Amount of work executed.

No. of miles of grading.	Earth excavation. No. of cubic yards.	Rock excavation. No. of cubic yards.	Clearing.		Increased capacity for water, in gallons.	Locality.
			Heavy mezquit.	Willow and brush.		
7	5,330	3,900				Between El Paso and Frontera.
3	10,000					Bet. La Mesilla and El Picacho.
100 yds	200					Branch road, near La Mesilla.
3¼*m*	100					Arroyo, around base of Picacho.
100 yds	100					Cañon through *Half-way* hills.
0	222	39			40,000	Dam, for reservoir, 26*m*. west of Picacho.
13		500				Bet. dam and Cook's spring.
0	101	30			16,362	Well and tanks, 12*m*. east of Cook's spring.
0	166				26,892	Tanks at Cook's spring.
2½		168				Pass through Mimbres mountains.
0	66				10,692	Trench at Ojo la Vaca.
3		120				Bet. Ojo la Vaca and Ojo Excavado.
0	34				5,508	Basin at Ojo Excavado.
5		120				Bet. Ojo Excavado and valley of Playas.
0	707				114,534	Tank and well in valley of Playas.
0	87				14,094	Well in valley of the Lagunas.
1	150	10				Pass through Piloncillo range.
0				14*m*		Bet Piloncillo Pass and Rio San Domingo.
0	192				70,000	Tank on Rio San Domingo.
0	83				13,446	Tank at Sycamore spring.
1½		100		5*m*., (stms.)		Crossing of spur of San Calisto mountains.
15	10,000		7	10		Along the San Pedro river.
18	9,000	6,000	10	25		Along the Gila river.

Total excavation = 57,525 yards: Earth, 46,538 yards; rock, 10,987 yards. Increase in watering facilities, in gallons, = 311,528, which is less than true amount, as a cubic foot is considered as containing 6 gallons when it really contains nearly 6½.

Much clearing of loose stone from roadway was done, which was not measured, and is not presented in the table.

Record of thermometer.

NOVEMBER, 1857.

Date.	6 a. m.	12 m.	6 p. m.	Remarks.
	°	°	°	
19th		71	55	Warm and clear.
20th	30		46	Bright and clear.
21st	55	61		Do.
22d	31		55	Warm and clear; wind south.
23d	26	74		Do.
24th	29		53	Do.
26th	31		57	Do.
27th	37	35		West wind, and rain.
28th	36			Do.
29th	35			Bright and clear; west wind.
30th	24		54	Cold breeze from east.

DECEMBER, 1857.

1st	16	64	53	Clear and warm.
2d	25	75		Do.
3d	37		53	Do.
4th	27			Do.
7th		67	42	Cold wind, and cloudy.
9th	10		41	Very cold.
10th	35			Clear and bright; east wind.
11th	25		57	Clear and bright; southeast wind.
12th	24	75	57	Do. do.
13th	25	50	57	Cloudy; no wind.
14th	57			Do.
17th	37	57		Clear and warm.
18th	37		50	Do.
21st	29		55	Do.
22d	35		45	Cold and windy.
23d	30		40	Clear and warm.
24th	29			Do.

MARCH, 1858.

27th			75	Clear and warm.
28th	48	73	42	Do.
29th	39	77	56	Do.
30th	37	83	72	Do.
31st	46	91	73	Do.

APRIL, 1858.

1st	56	90	80	Strong west wind.
2d	60	32		Do.
3d	65		80	Do.
4th	55	80	74	Do.
5th	56	90	72	Do.

Record of thermometer—Continued.

APRIL, 1858—Continued.

Date.	6 a. m.	12 m.	6 p. m.	Remarks.
	°	°	°	
6th	60	83	72	Strong west wind.
7th	43	--------	62	Do.
8th	45	73	66	Rain at dark.
9th	47	83	60	Do.
10th	45	60	55	Cool and cloudy.
11th	37	75	60	
12th	45	83	65	
13th	--------	88	66	Clear and warm.
14th	51	86	78	Do.
15th	57	--------	65	Cloudy.
16th	55	85	67	Cloudy.
17th	50	--------	45	Rain.
18th	34	55	35	Cloudy.
19th	45	65	53	Clear; wind from north.
20th	48	73	57	Do.
21st	50	85	67	Do.
22d	48	--------	66	Do.
23d	45	90	--------	Do.
24th	45	92	--------	Do.
25th	48	92	76	Do.
26th	58	87	75	Do.
27th	50	87	--------	Do.
28th	50	77	--------	Rain and cloudy.
29th	--------	64	48	Cloudy.
30th	35	57	--------	Cloudy.

MAY, 1858.

1st	34	63	54	Wind north.
2d	38	65	58	Clear; southeast wind.
3d	42	75	59	South wind.
4th	50	79	45	Clear; wind southwest.
5th	38	--------	68½	Do.
6th	50	77	--------	Do.

SEPTEMBER, 1858.

13th	--------	107	80	All in Gila river.
14th	70	110	--------	
17th	--------	110½	95	Very warm.

Meteorological register for Fort Fillmore, New Mexico.

Months.	Thermometer.				Rain.
	9 a. m.	2 p. m.	9 p. m.	Daily mean.	Amount in inches.
1857.	°	°	°	°	
July	80.22	93.58	80.48	84.76	.43
August	77.41	88.48	79.58	81.84	3.68
September	68.63	79.10	71.60	73.01	2.24
October	57.70	71.71	63.22	64.37	2.41
November	47.16	64.16	53.36	54.89	.00
December	31.83	52.35	39.96	41.35	.15
1858.					
January	29.58	53.19	37.32	40.04	.40
February	43.85	60.28	35.07	46.51	.00
March	42.83	66.35	50.90	53.37	.22
April	59.30	80.08	60.90	66.79	.00
May	61.29	87.77	63.06	70.70	.00
June	74.73	93.63	73.96	80.80	1.59
July	78.25	92.61	77.38	80.16	2.59

HYGROMETER.

1857.					
July	69.13	79.54	70.12	72.80	....
August	68.32	72.35	69.80	70.15	....
September	62.33	68.70	62.40	64.44	....
October	52.83	62.06	55.38	56.81	....
November	42.33	53.16	46.66	47.49	....
December	27.45	43.93	34.22	35.19	....
1858.					
January	26.83	43.77	31.74	34.00	....
February	31.03	49.35	37.17	39.08	....
March	37.22	55.90	43.73	45.55	....
April	49.30	60 86	51.06	53.76	....
May	51.74	62.80	53.45	55.99	....
June	62.56	71.30	62.66	65.50	....
July	68.51	75.16	68.03	70.58	....

Memoranda for Emigrants.

The best season for emigrants, or persons driving stock over this route, to leave the neighborhood of Fort Belknap, Texas, is about the latter part of July, or the first of August; for the reason that along the eastern line of travel through Texas, connecting with this road at El Paso, the rainy season is just ending, and water is abundant in all "jornadas," and the grass is in its most favorable condition. West of the Rio Grande, moreover, the same advantages are obtained, besides having the cool months to pass down the Gila, and from Fort Yuma to San Diego, or other parts of California over the Colorado desert.

Should it be desirable to recruit stock about the vicinity of the Mimbres river, a camp should be formed about six (6) miles above the road crossing, where wood, water and grass abound.

During the summer months, and when the Gila is low, large droves of cattle would pass more easily down the San Pedro to its mouth, and thence down the Gila, fording that river several times; wagons could not be carried over this route.

All recruiting of stock should be done along the San Pedro, and the Gila end of the route passed over rapidly; particularly with large bands of stock, as they run great risk of being scattered and lost in the wide, brushy, bottom lands.

Corn and wheat can be obtained at all points on the Rio Grande, varying in price from $1 50 to $2 50 per fanega (of 2½ bushels.) It can also be obtained at Tucson, fifty miles from the crossing of the San Pedro, and at the Maricopa villages on the Gila.

Persons passing along during the dry season between Ojo la Vaca and Ojo Excavado, with a large amount of stock, should divide their herd at the crossing of Burr's cañon, nine miles from Ojo la Vaca, sending a portion up the cañon five miles to a tank in the rocks, by an old road, joining the present one, one mile beyond Ojo Excavado.

The places where most particular caution in regard to Indians must be exercised are at the crossing of the Mimbres, the Piloncillo pass, and along the San Pedro river; though they are not at all troublesome if any guard whatever is maintained.

Persons going to the vicinity of Fort Buchanan take *all left hand roads*, beyond Croton springs; going to Tucson, from crossing of San Pedro, take left hand road, three miles from river, near spring.

N. H. HUTTON.

Table of distances and camping places on the line of El Paso and Fort Yuma wagon road.

Name of station.	Distance from preceding station.	Distance from El Paso.	Remarks.
	Miles.	*Miles.*	
El Paso	0	0	
Cottonwood, (ranche	22.0	22.0	Wood, water, and grass abundant.
Crossing of Rio Grande	20.0	42.0	Do. do.
La Mesilla	3.0	45.0	Do. do.
El Picacho	6.2	51.2	Wood at short distance; good water and grass.
Tank	25.0	76.2	Wood at short distance; rain water, good grass.
Cook's spring	25.2	101.4	Wood, water, and grass abundant and convenient.
Rio Mimbres	16.8	118.2	Grass and water convenient, wood scarce.
Ojo la Vaca	13.4	131.6	Wood and grass at short distance; good spring water.
Ojo Excavado	13.1	144.7	Wood, water, and grass convenient.
Tank	17.1	161.8	No wood; grass and water convenient.
Well	11.1	172.9	Do. do.
Cottonwood spring	11.9	184.8	Wood, water, and grass convenient; water *not permanent.*
Rio San Domingo	14.0	198.8	Wood and water convenient, grass poor.
Sycamore spring	23.4	222.2	Wood, water, and grass convenient and abundant.
Croton spring	23.6	245.8	Spring water abundant; wood and grass distant.
Rio San Pedro	22.8	268.6	Wood, water, and grass abundant, and at convenient points.
Mouth of Arrivaypa	52.1	320.7	Wood, water, and grass abundant, and at convenient points.
Spring, (cottonwood)	15.6	336.3	Wood, water, and grass convenient, not abundant or permanent.
Spring	0.8	337.1	Wood, water, and grass convenient; spring uncertain.
Spring 3½ miles from road	11.5	348.6	Wood, water, and grass convenient; spring uncertain.
Rio Gila	19.2	367.8	Wood, water, and grass abundant and convenient.
Zaceleno camp	15.6	383.4	Wood, water, and grass abundant and convenient.
Maricopa wells	21.0	404.4	Spring water; grass and wood at short distance.
Foot of Little Desert	38.9	443.3	Wood and grass convenient, water little distant, grass scanty.
2d watering place	7.6	450.9	Wood and water convenient, grass scattering and poor.
Oatman's flat	20.3	471.2	Wood, water, and grass convenient and abundant.
Wellsville camp	15.5	486.7	Wood, water, and grass convenient.
Good camping ground	14.0	500.7	Do. do.
White's ranche	17.0	517.7	Do do.
Antelope peak	12.5	530.2	Wood, water, and grass convenient; very little grass.
Fillibuster's camp	5.7	535.9	Wood, water, and grass convenient; very little grass.
Old Salt Grass camp	18.0	553.9	Wood, water, and grass at short distance in arroyo.
Fort Yuma	19.2	573.1	Wood and water, no grass convenient.

NOTE.—Along the Gila grass is scarce and scattering, and should be looked for in patches off the road, from a half to one mile.

CONTENTS.

Location of road from El Paso to Piloncillo pass..........
Piloncillo pass to Pimos villages..........
Description of improvements effected on road..........
Summary of improvements in location, grade, &c ....
Rio Grande valley..........
Mimbres valley..........
San Pedro valley..........
Arrivaypa valley..........
Upper Gila valley..........
Gila valley between Pimos and Maricopas..........
Maricopas and Fort Yuma..........
Basin of valley of the Playas..........
Lagunas..........
San Domingo..........
Playa de los Pimos..........
Points of supply of timber..........
Memoir of country passed through..........
Suggestions as to future improvements..........
Conclusion..........

APPENDIX.

Table of temperatures..........
Meteorological register at Fort Fillmore for one year..........
Memoranda for emigrants..........
Table of distances..........

Reports of Superintendent George L. Sites upon the Platte river, Dacota, and l'Eau qui Court wagon road, constructed under the direction of the Department of the Interior. 1857, 1858.

DACOTA CITY, NEBRASKA TERRITORY,
July 10, 1857.

DEAR SIR: Enclosed herewith please find my report of a reconnaissance from the Platte river to Dacota City, for the wagon road from the Platte *via* Omaha Reserve and Dacota City to Running Water river, accompanied by a map of the survey.

The report has been hastily prepared, entering only into such details as immediately appertain to the road, so as to enable the department to give me definite instructions for my future government.

Upon the completion of the location of the road a full and complete report will be submitted.

With the permission of the department I shall bend every energy towards a completion of the construction of the bridges by the time cold weather sets in.

When the construction of the bridges shall have commenced it would add much to the convenience of the disbursing officer to have a place of deposit established at Omaha City. This would enable the employés to obtain the constitutional currency for the checks of the superintendent. At present these checks can be disposed of to local banks, for which they can obtain only a paper currency, most of which is foreign to the territory and of very doubtful value. I would suggest that the receiver of the land office at Omaha City would be a proper person with whom to deposit the funds. I had the honor of addressing a letter to the department under date of 26th ultimo, asking for a modification of my instructions, to which I would ask, respectfully, the attention of the department.

I have the honor to be, very respectfully, your obedient servant,

GEO. L. SITES,
Superintendent wagon road from Platte to Running Water.

Hon. JACOB THOMPSON,
Secretary of the Interior.

DACOTA CITY, NEBRASKA TERRITORY,
July 10, 1857.

SIR: In obedience to a clause in my instructions of the 15th of May, 1857, requiring the superintendent to "report to the department from Dacota City, upon the portion examined that far" of the route for the wagon road from the Platte river *via* Omaha Reserve and Dacota City to the Running Water river, I have the honor to submit the following report:

My instructions ordered me to "proceed at once to the Platte river, and with your (my) engineer make preparation for a rapid reconnaissance and survey of the proposed road, with a view to ascertain the proper location, and to determine the amount of earth work to be done, the number and character of the bridges which will be required, and the facilities for the construction of the bridges, and such other information as will advise the department of the approximate cost of the road, and enable it to furnish you (me) with definite instructions for your (my) future government."

In reference to the character of this road my instructions say: "It is presumed that Congress did not contemplate the construction of a road designed to be thoroughly graded and bridged, to be commenced with a view to future appropriations, but that a road to meet the *immediate wants of the settlers* in that region should at once be made from point to point; such a road as can be made throughout the entire distance for the sum appropriated for that purpose."

Under the clause last referred to I was induced to make an examination of that part of the Territory lying north of the Platte in which the settlers had located, and for whose "immediate wants" I was ordered to construct the road.

I found that the settlements in that portion of the Territory were confined, with but few exceptions, to the Missouri bottom and bench lands, the Platte valley, and upon the various streams whose waters flow into the Missouri or Platte. Upon the Missouri or Platte, they run back from the rivers respectively to a distance of about ten miles, meandering in most instances with the rivers until you approach the mouth of the Platte, when they extend to the valley of the Elkhorn, a distance of about twenty-five miles from the Missouri and about fifteen miles north of the north bend of the Platte. Upon the tributaries they are confined to the immediate valleys of the streams, running back from one to twenty miles, where they debouch from the bluffs or divides.

The timber is scarce and only found within the valleys of the Missouri and Platte, in close proximity with the water and upon the side of the bluffs next the river, and the ravines bordering upon the small streams, with here and there a few scattering groves of timber of from ten to two hundred acres. The timber in the bottoms consists of cottonwood, with some cedar, and upon the bluffs and in the ravines oak, walnut, elm, and hickory are found. The counties of Sarpy, Douglas, Washington, and Dacota, have the great body of the timber and at present contain about seven-eighths of the entire population north of the Platte. The country upon the divides between the Elkhorn and the Missouri is perfectly destitute of timber, so also is the Elkhorn valley north of Fontenelle, the county town of Dodge county.

I am also informed, by a gentleman of undoubted veracity, that there is no timber upon the small streams putting into the Elkhorn. If my information is correct, a road along this route would be impracticable, on account of the great expense that would attend the bridging of the several streams to be crossed; the timber for the construction of the bridges would have to be obtained from the Missouri.

There is another divide and which is one of the routes I have hereinafter proposed to examine on my return along which a trail is found, known as the "Poncas trail," which winds with the ridges, very meandering, and along which wagons pass in time of a flood, from Omaha City to Iowa creek, passing about fifteen miles from this place; its general direction being west of north. I am informed that, from its serpentine character, it increases the distance between thirty-five and forty miles, and that no water is to be found upon or very near the route. No stream is upon this route for a distance of some eighty miles. The construction of a road upon this route would cost nothing, as there is already as good a road as could be made, without involving a heavy expenditure in grading. Of its character, however, I can speak definitely after reconnaissance.

These considerations led me to make a reconnaissance first of a route for the road through the counties of Sarpy, Douglas, Washington, and Burt, *via* Omaha Reserve, which is eighteen miles from south to north, to Dacota City, in the county of Dacota, through and over what is called the bench-lands, or second bottom of the Missouri, and the ridges or divides through tracts of Sarpy and Douglas counties, and the entire width of the Omaha Reserve, at an average distance from the Missouri river of about five miles, with numerous streams, affording water at all seasons. Over this route a good road can be obtained, almost direct, with an easy grade; the only objection being the expenditure involved in the bridging of the numerous streams, the character and expense of which will be found in the Appendix marked A.

We procured the field notes of a survey of a territorial road from Cedar island, upon the Platte, about seven miles from its mouth, to Omaha City, and we made a survey with compass and chain, from a point on the Platte river, about three miles from its mouth, *via* Bellevue, to a point where it intersected a survey of a territorial road from Bellevue to Omaha City, notes of which we also procured.

By the kindness of one of the commissioners we were permitted to copy the bearings and distances of a territorial road surveyed from Omaha City to Dacota City.

We measured the distance upon the present travelled route from Omaha to Dacota with the odometer; and we noted the crossing of streams and the topography of the country over which we passed; the routes, whether run by the compass or measured by the odometer, will be found upon a map which has been hastily but very accurately prepared, under the direction and supervision of my engineer, Mr. Smyth, by Mr. Snyder, a young gentleman who has proved himself very useful to our party, especially in assisting Mr. Smyth. The river was drawn from the United States surveys, so far as they have been made, and from the best authorities at our command. I believe you will find the Missouri river more accurately laid down in this than in any map extant.

We propose, unless otherwise directed by you, to so divide our party, upon our return from the l'Eau qui Court, that we may be enabled to take a rapid view of at least two additional routes between this place and Omaha City.

As at present advised, I cannot suggest the most proper route for the location of the road from the Platte to Omaha City; the Platte river was in a very high stage of water, and our examinations, which occupied two days, did not satisfy us of the point where a safe and reliable ferry could be obtained.

The current is very swift, and at the point where we took its measurement we found it to be about 1,900 feet wide, varying in depth from one to ten feet—banks low, but not subject to overflow, and a quicksand bottom. I am informed its greatest rise does not exceed thirty inches, and from Fort Laramie to its mouth, a distance of about 850 miles, it maintains about the same width, with an average fall of six feet to the mile. We can somewhat imagine the velocity of its waters when we come to recollect that the Missouri river, the current of which is proverbial for swiftness, has, from Council Bluffs to St. Louis, but an average fall of six inches to the mile. Unless a more feasible route can be obtained upon the "Poncas trail," I am of the opinion that the proper route for the road from Omaha City to this place would be upon or near the route laid down on the map accompanying this report, as the survey of the territorial road.

Much improvement could be made upon that route when we come to locate; and some of the streams, I am satisfied, can be avoided, or crossings can be obtained by cutting down the banks; this would materially lessen the expenditure. We can avoid grading upon the whole route from the Platte to this city, with the exception of crossing the bluffs about seven miles above Omaha City, and in the Omaha Reserve; and I am led to believe that but little grading will be found necessary, when a careful examination shall be made at the time of the location of the road.

By both the travelled and surveyed routes, the streams and the character of the bridges do not materially differ. We find that there will be twenty-four bridges to be constructed, varying from ten to seventy-five feet in length, at an estimate of $75 to $1,000; the estimate for the cost of construction being graduated according to the length of the bridges. The total estimate for the construction of the twenty-four bridges is $11,725. The grading is estimated in gross at $3,275—making a total of $15,000—for bridging and grading from the Platte to Dacota City, a distance of 104 miles. For the detail, in reference to the bridges, I beg to refer to the data furnished by my engineer, in Appendix A.

By winding with the ravines an easy grade can be found over the greater part of the route; the estimate therefore of the engineer for grading is only in a gross sum, without being able, from the rapidity of our reconnaissance, to obtain the proper data upon which to found even an approximate estimate. You will therefore exercise a great degree of allowance for any discrepancy that may occur between the present estimate and the actual cost of grading. The estimate for bridges, with the facilities for obtaining lumber, will more nearly approximate the actual cost.

By this route from the Platte to Omaha City it is about thirteen and one half miles, eight of which is upon the Platte river, Papillion creek, and Mud creek valleys, nearly level, and the remainder lies upon a high, rolling prairie.

From Omaha to Florence, a distance of five miles, it lies upon the level bench lands of the Missouri.

From Florence to Fort Calhoun, a distance of about nine miles, there is about four and one half miles over the bluffs somewhat rough, and the remainder upon high prairie, nearly level.

Fort Calhoun to De Soto, a distance of five miles, it is level, passing through about three miles of timber directly at the foot of the bluff, and two miles of prairie.

De Sota to Cumming City, seven miles, one of which is upon high, rolling prairie, and six upon bench land. Cumming City, *via* Tehamah, to Decatur, about thirty-two miles, the route is level, upon bench lands. We here pass into the Reserve, eighteen miles in width, the entire distance of which is high, rolling prairie, known as the Blackbird hills, skirting upon the timber in the gorges putting into the Missouri. By winding with the ravines and ridges a very fair road can be obtained.

This brings us to the foot of the bluffs, where we have the bench lands of the Missouri to Dacota City, a distance of nine miles.

We start immediately upon the reconnaissance from this place to the Running Water, and, owing to the mail facilities, will not be able to forward a report of this portion of the route until after our return to Dacota City.

All of which is most respectfully submitted.

I have the honor to be, very respectfully, your obedient servant,

GEORGE L. SITES,
Superintendent Wagon Road from Platte to Running Water.

APPENDIX A.

Statement of the number and character of the bridges which will be required, and the facilities for the construction of the same, between the Platte river and Dacota City.

Papillion creek,	bridge	60 ft.,	timber within	1 mile,	steam saw-mill	1½ mile,	cost.	$900
Creek S. of Omaha,	"	30	"	1	"	1	"	400
Ravine N. of Omaha,	"	15	"	2	"	1	"	100
Spring creek,	"	50	"	3	"	3	"	800
Ponca,	"	30	"	1	"	1	"	400
— creek S. of Calhoun,	"	15	"	1½	"	1½	"	100
— creek S of Calhoun,	"	15	"	2½	"	2½	"	100
Moore's creek,	"	70	"	1½	"	6	"	950
Mill creek,	"	25	"	2	"	3	"	250
Glover's creek,	"	12	"	1½	"	1½	"	75
South creek,	"	12	"	4	"	6	"	75
North creek,	"	20	"	4	"	7	"	150
New York,	"	60	"	9	"	12	"	900
Pike creek,	"	30	"	11	"	14	"	400
— creek,	"	20	"	12	"	9	"	150
— creek,	"	20	"	12	"	8	"	150
— creek,	"	10	"	12	"	7	"	75
Tekamah creek,	"	50	"	4	"	½	"	800
Silver creek,	"	50	"	½	"	4	"	800
Elm creek,	"	40	"	1	"	1	"	600
Wood creek,	"	40	"	1	"	1	"	600
South Blackbird,	"	75	"	2½	"	8	"	1,000
North Blackbird,	"	75	"	—	"	—	"	1,000
Omaha creek,	"	70	"	2½	"	½	"	950
								11,725
Grading								3,275
								15,000

Bridges are not absolutely necessary across Moore's creek and the two Blackbird creeks, as fords can be obtained by cutting down the banks, which, however, are very high and steep; but these streams will often be impassable on account of high water, and, if possible, bridges should be built across them for the convenience of the travelling public.

The cheapest and simplest plan for all the bridges on this road, I think, is as follows:

The abutments to be formed by driving piles to a solid foundation, in a row, and sawing them off to a proper level, and connecting them at the top by a cap-sill; and they may be further secured by diagonal braces halved to the uprights or pinned to them. For the longer bridges there should be several bents placed parallel to each other, and firmly connected together by cross pieces. Where piles cannot be driven, a grillage may be formed by laying square timbers horizontally across each other and securing the uprights to them, and the grillage retained by an enrockment; or the abutments may be made of cribs composed of large square timbers, halved into each other and otherwise firmly connected with iron bolts or wooden braces, the enclosed area being filled with stone or earth.

THE FRAMES.

For a bridge not exceeding 12 feet sleepers are to be laid parallel to the direction of the road-way, resting on the supports, to which they are notched or pinned with iron bolts, and the flooring nailed down on them.

If the bridge is from 12 to 20 feet long short pieces, termed *corbels*, will be placed on the caps of the piers or abutments, which will serve the purpose of lessening the bearings. When the bridge is over 20 feet long the corbels will be supported by struts. When the bridge exceeds 30 feet and is less than 40 feet in length, it will be best to displace the corbels and put a straining beam in the middle of the sleepers, and sustain it by two struts. For bridges above 40 feet in length it will be necessary to use both the corbels and straining beam.

In the above cases the floor rests on the frame. In some of the bridges to be constructed it will be better for the flooring to be suspended from the framing. For this purpose the simplest arrangement will be to have a tie-beam resting on two supports, with two inclined pieces mortised near the ends of the tie-beam, and abutting against an upright or king post placed in the middle of the tie-beam. The cross joists are laid on the tie-beam, and with it are suspended from the inclined pieces by means of the king post.

For bridges between 40 and 100 feet long a straining beam should be placed between the upper ends of the inclined pieces, and suspending the road-way and tie-beam from these points by two stirrup pieces termed queen posts; and diagonal braces should be placed in the space between the queen posts and tie-beams.

The points where joists may occur in the sleepers or chords should be supported by iron castings, and the stirrup pieces or uprights should be well strengthened with large iron rods. In locating the road it may and probably will be necessary to make some change in the plan of a few of the bridges.

HENRY B. SMYTH,
Engineer.

BELLEVUE, NEBRASKA TERRITORY,
August 10, 1857.

SIR: I have the honor to herewith enclose my report for that portion of the route for a wagon road between Dacota City and the Running Water.

I would also acknowledge the receipt of a letter dated the 9th of July, 1857, from Albert H. Campbell, general superintendent Pacific wagon roads, advising me that $3,000 of the appropriation would be reserved to meet unforeseen contingencies, &c.; also a communication from the department, modifying my instructions, dated the 11th of July.

The latter part of the 4th clause of my instructions of the 15th of May indicates that "further instructions for my future government" will be given upon receipt of my reports. I have not as yet received any further instructions subsequent to the receipt of my report of the 10th ultimo.

I have the honor to be, very respectfully, your obedient servant,

GEORGE L. SITES,
Superintendent Nebraska Wagon Road.

Hon. JACOB THOMPSON,
Secretary of the Interior.

BELLEVUE, NEBRASKA TERRITORY,
August 10, 1857.

DEAR SIR: In obedience to my instructions of the 15th May last, ordering me to make a rapid reconnaissance and survey of a route for a wagon road from the Platte river, *via* Omaha Reserve and Dacota City to the Running Water river, under date of the 10th of July I submitted a report of the route from the Platte river to Dacota City. I now have the honor of reporting upon that part of the route between Dacota City and the Running Water river.

Dacota city is situated upon the Missouri bottom, on the west bank of the river, several feet above high-water mark, at a distance of about 8 miles from the bluffs on the southwest, and about 5½ miles south of Sioux City. It is 96 miles north and 27 miles west from the mouth of the Platte river, which would be, in a direct line, N. 16° W., 100 miles. Just above this city the Missouri takes its great bend, known as the "Serpentine Bend," and near where the river changes its course from a direction south of east to that of east of south. From a point upon the west bank of the river, and upon the eastern boundary of Dacota City, it is 3½ miles, in a due west course, through the botto to the south bank of the river as it comes from the west, and just befor the river has taken its great bend; whilst the distance between the points by the river is estimated at 20 miles.

We left Dacota City on the 11th of July and travelled over th bottom N. 75° W., S. $\frac{70}{100}$ miles, where we struck the bluffs, whic are low and regular, and of easy ascent; in nearly the same directio we passed over the divide about one mile, when we came into the El creek valley; passing up this valley for about three miles in about th same course we ascended by an easy grade upon high prairie, somewha rolling, but eligible for a road without grading, over which we passe to Ayoway creek, at a distance of $7\frac{63}{100}$ miles; thence up Ayowa creek valley N. 69° W., $11\frac{24}{100}$ miles; thence north seven miles ove rolling prairie, somewhat rough, on to Lime creek. This directio was taken so as to avoid what is known as the Lime creek hills, which cover an area of about eight miles square. They are cone-like in form with but little vegetation, very precipitous and rough from washing by the rain. The ravines are short and abrupt, forming deep gulches. Through these hills there is a circuitous divide, or narrow ridge, ver hilly, with a rough surface, caused by washing, over which a road, i my opinion, is impracticable, on account of the increased length o the road, the narrowness of the top of the ridge, the abrupt ascent and descents, and the unevenness and roughness of the surface. From Lime creek we passed, in a westerly course, over a divide, into the Missouri bottom, subject to overflow, which we soon left for the bluffs. Passing over these bluffs, at a distance of about ten miles from Lim creek, we came upon a high prairie, slightly rolling, looking down upon Bow creek valley to the westward about two miles; here we changed our course to N. 35° W., and at the distance of three miles we came into the Bow valley, which, at this place, maintains a width of about one mile; thence along the valley in the same course about four miles to the crossing of Bow creek. Here we crossed upon a temporary bridge, from which we bore N. 45° W. up the valley of a very sluggish stream (a tributary of the Bow) for about four miles; thence S. 70° W. on a level prairie to a small creek, believed to be the west branch of the Bow, which we crossed by fording at a distance of nine miles from the main Bow. In looking immediately to the west we saw nothing but sharp cone-like hills, which induced us to take a course S. 45° W., along and over a divide three miles to a small stream, with water clear and cold, to which we gave the name of Campbell's run. Here we found a spring running from a chalk bank; the water was excellent and very cold. We again started due west, crossing the run at a ford with a stone and gravel bottom, and passing up a wide ravine bearing to S. of W., and down another we came, at the distance of 3½ miles, upon the valley of a creek called by us Smyth's creek; the banks of this creek were high and perpendicular. Passing up the valley nearly south for about three miles, we here unhooked our horses from the wagons, and, after crossing the horses, we attached ropes to our wagons, and with the horses pulled them over. We again started on a westerly course and soon reached a high divide, the general direction of which appeared to be about NE. and SW. To the westward, as far as the eye could reach, we saw nothing but a succession of hills and ravines, with a range at the horizon, supposed to be about twenty miles distant, much higher and more abrupt in appearance than those in our immediate vicinity. On looking to the N. and NW., at a distance of from five to eight miles, we could distinctly trace the meanderings of the Missouri river. We here became confirmed in the opinion entertained after leaving the Bow valley that an eligible route for a road could not be obtained in the direction of the l'Eau qui Court from Ayoway Creek, unless we should be able to find streams, the general direction of which should be to the north of west; unless, indeed, we should pass much further to the south than the point to which we were to run would justify. We were satisfied that such streams were not likely to be found so near the Missouri. We therefore kept upon the divide, running in a southwesterly direction, surveying minutely the character of the country at every point of the compass. Immediately to the SW., we saw (what we afterwards found to be very noted) a lone tree about five miles distant, standing at the head of a ravine, perhaps fifty feet higher than the divide upon which we then were, and a few yards to the south of this tree the divide appeared to reach its greatest altitude. From this point we could view the whole surrounding country; to the N.NW. and W. we could see nothing but interminable hills and ravines, whilst in the distance we still observed this range of hills bearing apparently SE. and NW.; to the south, whilst the general appearance of the country was rough and broken, the hills gave evidence of more regularity, and to the SE., at some distance, we discovered and particularly noted a valley of considèrable extent bearing E. and W., the waters evidently flowing to the east. Upon reading the odometer we found we had travelled eleven miles from the crossing at Smyth's creek. Still continuing on the divide, we saw to the south of west a grove of timber, which we reached about sunset, having travelled four miles since the last reading of our odometer. Here we found a beautiful grove, which we afterwards learned was called "Secret Grove," entirely surrounded by high hills, except the opening toward the north made by the ravine in which the grove is situated. The bed of the stream was dry at this time, but we found a deep gulch filled with water, sufficient for ourselves and horses. We crossed the ravine upon a temporary bridge constructed by our party, and bearing to the west we ascended a high ridge, from which we again saw to the N.NW. and W. the same high range of hills observed before; and in looking down irregular ravines at several points as we passed to the SW., we discovered timber marking the course of a stream which we had good reason to believe would be found difficult to cross. We therefore continued our course to the southwest, toward a high bluff bank in the distance, crossing a small run (which we afterwards ascertained to be the east branch of Bazil creek) and valley at a distance of eight miles from the grove. Whilst it was observed that this valley led in the direction of our proper route, it also led us down upon the creek that we were avoiding or trying to head, which we supposed could be done at or near the bluff banks. Continuing in the same course, we passed across a valley without water and up a ravine to the south of the bluff bank until we reached a high divide, when we struck an old Indian trail, now almost obliterated. We followed this trail on the divide in about a due west course on down a ravine to the valley of Bazil creek, having travelled fourteen miles since we crossed the east branch. This creek affords more water than any stream crossed since leaving the Platte, with, perhaps, the exception of the Papillion. The banks are of medium height, along which are found a few groves and isolated trees. The water is twenty-five feet wide, muddy and swift, with a depth of from ten to twenty inches, and a bottom of quicksand. The valley is from three-fourths to one mile wide, lying in a regular curve, and from the evenness of its surface, its proximity to water, and the richness of its soil, it promises to the farmer an easy cultivation and an abundant harvest.

Passing down the valley at the distance of three-fourths of a mile we again crossed the east branch upon a temporary bridge raised by our party, and after ascending a ridge to the north we discovered the general direction of the valley to be about northwest; passing still to the north, for the purpose of finding a divide running parallel with the creek, we headed several deep ravines, and came, at a distance of about five miles from the east branch, upon the expected divide, where we also found a trail. From this point, in a direction a little north of west, we had full view of the Missouri river, distant about five miles. We followed this divide in nearly a west course until we passed down a ridge terminating upon the valley of the Bazil, and found our odometer indicated that we had travelled a distance of three miles since our last reading. The character of the Bazil was observed to be the same as above; the current very swift, no still water, and a hard quick-sand bottom, interspersed with small gravel. We here forded the creek without difficulty, and found a small cabin and a corn-field in the valley to the west of the creek. We ascertained that the east branch put into the Bazil about six miles above our place of fording, and that we were about one mile from the Missouri river, up the bottom of which we could not pass on account of the drift wood and under brush.

We ascended a high ridge to the westward, precipitous and winding, with abrupt ascents and descents for about two and a half miles, having in full view, a little to the north of west, the Missouri and the Neobrara. Leaving this ridge we passed over the level prairie bottom of the Missouri, a distance of about one and a half mile, to a steam saw-mill recently erected on the town site of Neobrara; from here, in a due west course along the bottom, at the distance of two miles, we struck the mouth of the Neobrara, having travelled since we left Dacota City the distance of 130 miles.

Map makers and geographers have been greatly at fault in the character and course of the Neobrara towards its mouth. Lieutenant Warren, United States topographical engineer, being more accurate, indicates a southern bend to this river of about twelve miles, whilst others give a southern bend of from twenty to thirty miles. We found that the Neobrara, at a point where it diverges the furthest to the south, was distant about four miles from, and immediately south of, its mouth, forming between these points a regular arc, and its greatest divergence is about one mile from a line connecting the points of the arc. The course of the river from a point eighty miles from its mouth is due east—say seventy-six miles—to the bend, where, running to the north four miles in the manner above described, it discharges its waters into the Missouri. The valley, I am assured by a gentleman of intelligence and undoubted veracity, who has travelled upon both sides of the river, maintains its width of from one to one and a half mile for the distance of eighty miles, with numerous small streams putting in upon either side; the most of which, however, he represents to come in upon the south side. About seventy miles from the mouth pine timber is found in the ravines and gulches leading into the valley, and to the westward it is reported that pine is found in great abundance. The current in this river is as rapid as that of the Platte, with quicksand bottom; the water has a muddy appearance, but of lighter color than the Missouri or Platte. At a point two miles above the mouth of the Neobrara, and the point to which we propose to locate the road, we found the bed of the channel to be 320 paces wide, 140 of which was covered with running water, with an average depth of sixteen inches. Upon our return we started from a point upon the Neobrara, two miles from its mouth, running due east four miles, when we again ascended the abrupt hills, impracticable for a wagon road, over which we passed to Bazil creek to a good ford about one and a half mile below the ford we crossed in going west; passing over the valley we reached the bluffs to the eastward of the creek, about three miles from where we left the Missouri bottom. Having, in our reconnaissance west, noted the general direction of the valley of the east branch of the Bazil, and also the direction of the heading of the west branch of the Bow, we felt satisfied that if we could, by an easy grade, pass over the divide we should find a natural route, not only practicable, but highly eligible for a road, with but little cost of construction; we therefore greatly desired to reach this valley. We passed up and along the divide south 80° east three and a half miles, when we discovered to the southeast a ravine leading on to the valley of the east branch of the Bazil, which was about one and a half mile distant, and at a point about two miles from the confluence of the east branch with Bazil creek.

A road nearly level can be obtained by a small expenditure from the Neobrara, due east along the Missouri bottom, to Bazil creek, estimated at five miles; thence up Bazil valley south 70° east five and a half miles to valley of east branch; then up this valley two miles to the intersection of the travelled route. We travelled up this valley south 80° east thirteen miles to the divide, which we found to be about one mile to the southwest of Secret Grove; thence along the divide south 55° east one mile to a dry ravine of an easy grade, somewhat irregular at first, but directly putting into the valley of the West Bow, when we travelled due east for seven miles to a grove of timber. Our direct route here would have been to cross the creek and have continued our course about east; but failing to find a crossing, and observing that the valley made a bend to the south, we kept along the valley to the north of the creek, bearing north 70° east four and a half miles; here we changed our course with the valley due east three and a half miles to the crossing of the creek upon a very good ford. The valley here was about three-fourths of a mile wide, and leads off from the creek south 80° east upon a level prairie, resembling somewhat a large valley, twelve miles to the Middle Bow. The route, so far, with the changes indicated on Bazil creek, forms a natural route for a road for about fifty-three miles, with but three bridges to construct, and the only grading required being to cut a side road for a few rods along Bazil creek, where it washes against the hills. We here changed our course to north 65° east over a divide one mile to East Bow; up a ravine to the high level table land three and a half miles; thence south 70° east, on the table land four miles, to a ravine leading down on to Lime creek valley; thence north 45° east three-fourths of a mile to a ford. Immediately after crossing the creek we changed our course to south 45° east up a valley winding and irregular, three miles to the divide, between Lime and Ayoway creeks; thence about south 10° east down a ravine leading into the valley of Ayoway creek, and along the valley five and a half miles, where we intersected the route we travelled upon to the west; thence south 60° east over this route, along Ayoway creek $11\frac{24}{100}$ miles, to the crossing; thence by our former route over divide to Elk creek valley; down the valley and over the divide to the Missouri bottom; and thence to Dacota City, $20\frac{28}{100}$ miles; making the distance upon our return from the Neobrara to Dacota City about 103 miles.

The route from the Middle Bow to the head of Ayoway valley, about twelve miles, was not entirely satisfactory to me, and I am confident, when we come to make a more critical examination, we shall find a more direct and feasible route for the location of the road.

With this exception, from the character of the country, the comparatively few bridges to construct, the feasibility of a good road without grading, and being almost direct, I cannot hesitate to respectfully recommend the location of the road upon or near the route passed over from the Neobrara to Dacota City.

The great advantage of this route, in addition to the above considerations, is in the fact that at least eight-tenths of the route passed over a district of country in the immediate vicinity of which the lands are well adapted to farming purposes. The valleys upon the whole route are not only beautiful, but, receiving, as they do, the washings from the surrounding high lands, they are composed of a very rich loamy soil, and will yield the most abundant harvest to the husbandman. Whilst the timber is scarce, I think, by economizing, sufficient can be found upon the Missouri bottom and in the gulches leading into the Missouri and the small tributaries, for all practical purposes.

Between the Running Water (l'Eau qui Court) and Dacota City there are fifteen bridges to construct, with lengths varying from ten feet to one hundred feet, and estimated at from $75 to $1,200; for a detailed statement of which, and the facilities for constructing the same, I beg leave to refer to the report of my engineer hereto appended, marked Appendix A.

The grading upon this route will consist of a side-cut along the Bazil at three or four points where the creek washes against the bluffs, say in all sixty rods; the grading a side-cut just before passing into Elk Creek valley, and cutting down the banks upon Lime creek, Bazil creek, and several dry ravines, together with the earth work necessary for the embankments to the bridges, which in all is estimated at $1,775.

The total estimate for bridges is $4,850, which, added to the estimate for earth work, would make the sum of $6,625. The cost may slightly exceed the estimate, owing to a difficulty in obtaining timber, the probable inclemency of the weather, and the remoteness from settlements. These estimates are believed to be the actual cost, providing the work shall be done under the superintendence of the department. At least 100 per cent. would have to be added to the estimates above, as well as those heretofore given, to induce contractors to undertake the work. In this country they expect to make a small fortune in every contract with the government.

I have pursued the most rigid economy, consistent with an efficient discharge of my duties, with a view of carrying out the instructions of the department, in applying the greatest amount of the appropriation to actual road-making, and avoid involving the department in any deficiency. In economizing the funds we were driven to the expedient of somewhat increasing the length of the road for the purpose of avoiding deep ravines, and, in several cases, abrupt ascents and descents. This we have not done, however, to an extent that will materially injure the character of the road either as to length or directness. We find it necessary, also, to cross Lime and Bazil creeks by constructing fords, these being the only streams upon the route from Dacota City to the Running Water that will admit of fording. To these can be obtained a good sand and gravel ford; the other streams have high banks and soft mud and quicksand bottoms, rendering a ford not only impracticable but dangerous.

The present estimate, $6,625, for bridges and grading upon the route from Dacota City to the Running Water, added to the estimates heretofore made, $15,000, would make the gross sum of $21,625, which, deducted from $27,000, the sum ordered to be expended upon the road, would leave the sum of $6,375 to meet the expenses of locating the road, and the loss upon the sale of the stock and materials used in the construction of the same.

In my report of the 10th of July I proposed to make a reconnaissance of this route along the divide upon what is known as the "Poncas trail," and suggested that, from report, I was led to believe that the increased length of the route, from its windings and the entire absence of water, would be an insuperable objection to locating the road upon this divide. The examination confirmed the truth of this report, and I am of opinion that the location of the road upon that route would be of no practical benefit to the settlers of the Territory, afford no accommodation to the emigrant or traveller, and in no way meet the just expectations of the department. In view of these facts, I remain of the opinion expressed in my report of the 10th of July, that the proper route for the location of the road from Omaha City to Dacota City is upon or near the route of the territorial survey, a map of which was forwarded to the department. Since my return I have been enabled to make further and satisfactory examinations of the Platte river, and find a point for a good ferry at the distance of about three miles from its mouth. I would, therefore, respectfully recommend the location of the road upon or near the route, *via* Bellvuee, from the Platte river to Omaha City.

This route leads across the Platte valley and Pappillion Creek valley for about five miles; crossing over a divide for 1½ mile, we come upon Mud Creek valley, upon which we travel for about 4 miles; thence over a divide, by an easy grade, of 1½ mile to Omaha City. The route is nearly direct, and, with the exception of the two divides spoken of, is level.

All of which is respectfully submitted.

I have the honor to be, very respectfully, your obedient servant,

GEO. L. SITES,
Superintendent Nebraska Wagon Road.

HON. JACOB THOMPSON,
Secretary of the Interior.

APPENDIX A.

BELLEVUE, *August* 10, 1857.

Statement of the number of bridges between Dacota City and the Running Water, (l'Eau qui Court,) with an estimate of the cost and the facilities for constructing the same.

Slough	bridge	15	feet,	timber	1	mile,	steam	saw mill	1	mile	$100
do	"	15	"	"	1	"	"	"	1	"	100
Creek	"	15	"	"	1	"	"	"	2	"	100
Ayoway creek	"	70	"	"	½	"	"	"	½	"	950
Slough	"	15	"	"	2	"	"	"	1½	"	100
Creek	"	25	"	"	4	"	"	"	3	"	250
Slough	"	20	"	"	5	"	"	"	3½	"	150
Creek	"	15	"	"	10	"	"	"	9	"	100
Deep ravine, or gulch; some water; rough bridge	"	30	"	"	2	"	"	"	13	"	150
Do do	"	30	"	"	1	"	"	"	12	"	150
Branch	"	10	"	"	1	"	"	"	10	"	75
East Bow	"	30	"	"	2	"	"	"	9	"	400
Bow creek	"	100	"	"	1	"	"	"	8	"	1,200
West Bow	"	50	"	"	8	"	"	"	20	"	800
East Branch Bazille	"	15	"	"	15	"	"	"	15	"	100
Ravine in Bazille valley	"	25	"	"	5	"	"	"	5	"	125
											4,850
Grading estimated at											1,775
											6,625

Very respectfully,

HENRY B. SMYTH,
Engineer.

GEORGE L. SITES,
Superintendent Nebraska Wagon Road.

WASHINGTON CITY, D. C., *March* 4, 1858.

SIR: In obedience to your letter of January 7, 1858, directing me to "furnish the department, at the earliest practicable period, a report of your (my) operations, and a map of the same, from the commencement of your (my) work to the close; also a statement of the amount expended and the balance remaining in your (my) hands at the present time, together with a statement of your (my) opinion in regard to the resumption of operations in the spring," I had the honor, under date of January 14, 1858, to furnish you with the amount of the appropriation expended, the amount remaining in my hands, together with a statement of the available means yet remaining of the appropriation applicable to the construction of the road, as also my opinion in reference to resuming operations in the spring. I now have the honor to report my operations, in detail, from the commencement of the work up to the present period.

On the 4th day of June I reached Omaha City, Nebraska Territory, and, under my instructions of the 15th of May, repaired to the vicinity of the mouth of the Platte river to await the arrival of my engineer. Mr. Smyth arrived on the 25th, and on the 26th of June we started upon our reconnaissance, for the full particulars of which I beg leave to refer to my reports to the department, dated, respectively, the 10th July and the 10th of August, 1857. We commenced the location of the road on the 25th day of August, and completed it on the 12th day of October, 1857.

In the location of the wagon road from the Platte river, *via* Omaha Reserve and Dacota City, to the Running Water river, we started upon the north bank of the Platte river, about three miles from its mouth, at a post marked "Commencement of wagon road from Platte to Running Water," and running a little to the east of north we passed over the valleys of the Platte river and Pappillion, *via* Bellcone, to a high rolling prairie, thence on to Mud Creek valley, and over a divide, reaching Omaha City at the distance of 13 miles from the Platte, about 9 miles of which is over the rich bottom lands of the above named valleys, and the remainder over a delightful rolling prairie of a gentle grade, making the route to Omaha City highly eligible for a wagon road, with but a small expenditure, exclusive of the bridge across Pappillion creek.

Passing to the north through Omaha City, and crossing over a small creek upon the bridge erected upon the military road from Omaha City to Fort Kearney, we run along Twenty-fourth street, in the city of Saratoga, to its terminus, thence north 23½° west, to the foot of and through Main street, in Florence, over the second bottom lands of the Missouri, perfectly level, crossing Spring and Mill creeks, and reached the bluffs of the Missouri at a distance of five miles from the military bridge. Here we crossed a high ridge and passed down on to the valley of Poncas creek; crossing Poncas and following the valley for one mile we again crossed a divide, somewhat rolling, over on to the valley of Deer creek; thence along the valley and over Deer creek, where we again came upon the second bottom lands of the Missouri; crossing Turkey creek we reached the town of Fort Calhoun, at the distance of 14 miles from Omaha City and 38 miles from the Platte river.

Passing through Thirteenth street, in Fort Calhoun, and changing our course to west of north, still continuing upon the second bottom or bench lands, we crossed Moore's creek, Mill creek, and Glover's creek, and reached the city of De Soto, distant from Omaha 19 miles and from the Platte 33 miles.

We again came upon the highlands immediately adjacent to the river, passing over Ohio street in through the town of De Soto, and after continuing upon the highlands for one mile we descended again upon the second bottom or bench lands; crossing South creek we reached the town of Cuming City, distant 40 miles from the Platte. Thence north, on Clay street, through Cuming City; thence bearing to the W. of N., we crossed North creek, Stewart's creek, New York creek, Pike creek, Spring run, Dry creek, and Tekama creek, to the town of Tekama, distant from the Platte 55 miles; thence north, on Thirteenth street, through Tekama; bearing again to the W. of N., we crossed Silver and Elm creeks and reached Decatur City, lying to the south of and adjoining the Omaha Reserve, distant from the Platte 72 miles. Running up Broadway, through Decatur City and over Wood creek, we passed into the Omaha Reserve; up Wood creek valley for about four miles; thence over a divide of an easy grade on to the valley of the South Blackbird; thence along this valley to the crossing of the creek at the "Omaha Village;" here the valleys of the South and North Blackbird creeks come together; crossing the North Blackbird we reached, by a gentle grade, a divide, nearly level upon its surface, but somewhat winding, upon which we continued for about 16 miles, where we passed down from the bluffs to the Missouri bottom, and crossing Omaha creek we reached the town of Omadi, distant from the Platte 101 miles; thence, on Eighth street, through Omadi to the south end of Twentieth street, in Dacota City, distant from the Platte 105 miles.

The route from one mile north of De Soto to the Omaha Reserve, a distance of about 37 miles, was over the bench lands of the Missouri; a rich loam and sandy soil, unsurpassed for farming or grazing, and forms a direct and beautiful road. Through the reserve we wind along the divide which separates the waters which flow into the North Blackbird and Omaha creeks from those which flow directly into the Missouri.

Upon either side of this divide the country is rough and broken, and to the east, skirting upon the river, timber is found in considerable quantities; descending the ridge we pass over the first bottom lands, of great richness and fertility, but rather too low for a good road during the wet season; this brings us to Dacota City. From Dacota City, continuing over the first bottom lands, we reach St. John's City, at the distance of eight miles from Dacota City; crossing over a divide, we passed down upon and along the valley of Elk creek; thence over a rolling prairie and a divide to the valley of Ayoway creek; thence up this valley for about 16 miles, and over another divide, crossing Lime creek, to a high level prairie; thence, crossing East Bow creek and Main Bow creek, we pass over a beautiful, dry, level prairie to West Bow creek; thence along the valley thereof to a ridge dividing the waters of the West Bow and East Bazille creeks; thence along Bazille valley for about six miles, where we pass upon a high rolling prairie somewhat broken, and along a divide or ridge down on to the valley of Bazille creek; thence, crossing the Bazille, we again come upon the Missouri bottom, upon which we continue to the terminus of the road upon the Running Water river, (l'Eau qui Court,) at about one mile from its mouth, at the distance of 100 miles from Dacota City, and 205 miles from the point of commencement upon the Platte river.

The entire route from Dacota City to the Running Water river, with the exception of about 15 miles, is over a rich district of country, well adapted to farming and grazing, and forms an almost natural route for a good road.

The bridges upon the road, as located, have been constructed from the Platte river to Dacota City, with the exception of a few of small import.

They are of the most approved plan for durability and for cheapness of construction. The frames are all of hewn or sawed timber, and the flooring is of plank two inches thick. By giving personal attention to their construction, under the direction of the department, an economy was pursued which will enable the superintendent to construct the remainder of the bridges required, and perform the grading necessary to make a good wagon road over the entire route for the sum appropriated by the 34th Congress.

If the contract system had been pursued I have no hesitation in saying that from double the expenditure an equal amount of benefit would not have been received.

It is, therefore, entirely owing to the wise policy of the department that the small expenditure, so far, has been productive of so much good to the Territory.

The following is a list of the bridges:

Bridge across Pappillion creek, 68 feet long.
Bridge across a slough, 16 feet long.
Bridge across a slough, 15 feet long.
Bridge across Spring creek, 45 feet long.
Bridge across Poncas creek, 34 feet long.
Bridge across Turkey creek, 39 feet long.
Bridge across Mill creek, 54 feet long.
Bridge across Glover's creek, 20 feet long.
Bridge across Branch, 14 feet long.
Bridge across South creek, 29 feet long.
Bridge across North creek, 34 feet long.
Bridge across Stewart's creek, 29 feet long.
Bridge across New York creek, 48 feet long.
Bridge across Pike creek, 39 feet long.
Bridge across a slough, 10 feet long.
Bridge across Spring run, 27 feet long.
Bridge across a slough, 5 feet long.
Bridge across Dry creek, 19 feet long.
Bridge across Spring branch, 12 feet long.

Bridge across Tekama creek, 59 feet long.
Bridge across Spring branch, 17 feet long.
Bridge across a slough, 10 feet long.
Bridge across a slough, 7 feet long.
Bridge across Silver creek, 54 feet long.
Bridge across Elm creek, 27 feet long.
Bridge across Wood creek, 56 feet long.
Bridge across South Blackbird creek, 50 feet long.
Bridge across North Blackbird creek, 50 feet long.
Bridge across Omaha creek, 68 feet long.

Herewith you will please find a map of that part of Nebraska Territory through which this road runs, exhibiting the route of the road and the general topography of the country. This map has been carefully compiled from the United States surveys and from the best authorities at our command, to which is added our own personal observations of the country.

I have the honor to be your obedient servant,

GEO. L. SITES,
Superintendent.

Hon. J. THOMPSON,
Secretary of the Interior.

Having completed the work which called me to Washington, I have the honor to await the further orders of the department.

G. L. S.

LANCASTER, OHIO,
January 20, 1859.

SIR: Enclosed herewith please find my report of operations upon the wagon road from the "Platte river, *via* Omaha Reserve and Dacota City, to the Running Water river."

I have the honor to be, very respectfully, your obedient servant,

GEO. L. SITES.

Hon. JACOB THOMPSON,
Secretary of the Interior.

LANCASTER, OHIO,
January 20, 1859.

SIR: Under date of the 8th May, 1857, I received the appointment of superintendent of the wagon road from the "Platte river" *via* Omaha Reserve and Dacota City, to the Running Water river," for the construction of which the sum of thirty thousand dollars was appropriated.

Under instructions from the Secretary of the Interior, dated May 15, 1857, I repaired to the Platte river, and after a careful reconnaissance (for the particulars of which please see my reports, dated, respectively, July 10 and August 10, 1857,) I proceeded to locate the road in accordance with the law of Congress, making the appropriation and the instructions of the department, and completed the same over the entire route on the 12th day of October, 1857, for the details of which I beg leave to refer to my report of the 4th March, 1858.

My further operations upon the road up to the 21st December, 1857, when the inclemency of the season forced us to abandon the work, were communicated to you under date of the 4th March, 1858.

Under instructions from the department of the 19th March, 1858, I again commenced operations upon the road about the 1st April, 1858. The work consisted in grading and the construction of bridges.

The first grading done was a side cut along a bluff bank, three miles north of the Platte river, and near Pappillion creek bridge, of about one-half a mile in length, at a cost of a little less than $250, besides the use of our own teams. Between the Platte river and Pappillion creek we erected three small bridges across a slough, a ditch, and a ravine, to enable the travel to go directly upon the line of the road, and erected two others between Omaha City and Florence. The bridge across New York creek, from a defect in one of the large iron rods let down during the winter, a new rod was procured, and the bridge again erected out of the old material, with the exception of the rod and two or three new timbers. The screw of the defective rod on examination was found to have been burnt in its manufacture, so that the thread gave way with the weight of the structure. This is the only instance where the iron has so far proved defective. The remainder of the bridges constructed last fall, which comprise all those between the Platte river and Dacota City, were found upon our arrival in the Territory to be in good condition, and so continued until about the last of May, when the incessant and unprecedented rains, then of many days' duration, began seriously to threaten the bridges along the whole line; about this time, and when the earth was perfectly saturated with water, there came a heavy rain-storm which flooded and deluged all the low lands in the neighborhood of the Omaha Reserve, causing the North and South Blackbird creeks to rise to an unusual height, and we simultaneously lost the two bridges across those streams by the combination of drift-wood and high water. I was informed that the violence of the storm was such that in the space of a few hours the water in North Blackbird creek raised to the height of thirty feet above low water mark.

The next disaster to our bridges was at Omaha creek, lying to the north of the reserve, and in Dacota county. This creek formerly meandered about twelve miles below the town of Omadi, where it put into a bayou or lake with an outlet into the Missouri river, but some two years since this creek made a cut off just at the town of Omadi, and at the distance of a half a mile found its way into the Missouri.

This cut-off threw the whole fall of the stream, in its course of twelve miles, into that of a half mile, thereby so increasing the rapidity of the current as to cut the bed of the channel. About this time a milldam was erected a short distance above this cut-off, which checked the current above, whilst the water still continued to cut the bed of the stream below the dam.

Our bridge was erected about one mile above this dam. During the heavy rains and storms this dam gave way, and the deepening of the channel, which was from eight to ten feet, continued up the creek and above the bridge, and the banks, being composed of a loamy soil, and softened by the constant rains, commenced falling in, and in a few days reached the bridge. To prevent the timber and lumber from being carried away a party of our men were detailed to take the bridge apart and secure the materials. Upon a careful re-examination of the creek at, above, and below the site of the bridge, it was found impracticable, without the aid of a pile-driver, which was not at our command, to reconstruct this bridge. The increased width of the stream from bank to bank (from 80 to 90 feet) was too great to admit of a single span, and the nature of the lower banks, which had been the bed of the stream, were too spongy for an abutment, without piling, to bear the superstructure. Under these circumstances the materials were piled up, so as to protect them from the weather, and left near the former site of the bridge. This was a good bridge, 68 feet long, very useful to the settlers, and necessary to emigrants; it was, therefore, with deep regret I abandoned the reconstruction of this bridge.

Owing to subsequent high waters we lost the bridges across New York creek, Pike creek, and Spring creek.

Of the bridges that were carried away by high-water we reconstructed those across North and South Blackbird creeks, changing the former from a 50 foot bridge to one of 70 feet, and re-erected for the third time the one across New York creek. It will be recollected that the latter bridge gave way first, through the defect in the iron rod.

Considering the great amount of damage done by high water through western Iowa and Missouri, where scarcely a bridge was left standing, it should be a matter of congratulation that the bridges upon this road escaped with comparatively so small a loss.

It may be safely premised, after our experience of last summer, that no future high water will affect the bridges upon this road, unless it be by the washing of the banks, which, from the nature of the soil, it is not possible to guard against without involving a much larger expenditure of money. My own opinion is, that the bridges constructed and now remaining will continue permanent, with slight repairs from time to time, until the materials out of which they are constructed shall decay.

All of the streams between the Platte river and the south line of the Omaha Reserve, with but a single exception, were crossed where they run through the second bottom of the Missouri river, the waters of which, in its greatest height, never reach these points of crossing. The soil is a rich, black sand and loam, very fertile and productive, the banks of the streams sparsely spotted with timber, and covered with a luxuriant growth of weeds, attaining to a height of from 10 to 12 feet, and which last season extended to the water's edge. This growth of weeds, together with the serpentine course of the streams, account for the sudden and unprecedented rise in these streams; and yet another cause conduces much to increase the volume of water which in a few years will be obviated. I allude to the yet comparative small quantity of land in cultivation towards the source of these streams.

The well-matted prairie sod forms an excellent bed to carry off the water, directly after its fall, to the streams. The opening of these lands to cultivation, while they will richly repay the husbandman, it will also materially and beneficially affect these high floods, and be highly advantageous to the bottom lands.

Springs of beautiful, clear, cold water universally form the sources of these creeks; in fact, I know of but one exception in the whole country, that of Fish creek, which lies to the east of the road, and which takes its rise from a slough formed by the discharge of several creeks without any visible inlet. Quite a number of small creeks are lost entirely in the first bottom of the Missouri before they reach that stream.

The lands lying between the reserve and the Platte river, and in the vicinity of this road, are either held by pre-emption or by what is familiarly known as claims, a large portion of which are in cultivation; it is unsurpassed in beautiful scenery, or in the richness and productiveness of the soil; it is destined to be a great producing country, and will command the attention both of the agriculturist and stock grower.

This road and the facilities offered by the bridges are of immense benefit to the settler and the emigrant.

During the year 1857 we constructed the following bridges:

Across	Pappillion creek	68	feet	long.
	slough	16	"	"
	slough	15	"	"
	Spring creek	45	"	"
	Poncas creek	34	"	"
	Turkey creek	39	"	"
	Mill creek	54	"	"
	Glover's creek	20	"	"
	Branch creek	14	"	"
	South creek	29	"	"
	North creek	34	"	"
	Stewart's creek	29	"	"
	New York creek	48	"	"
	Pike creek	39	"	"
	slough	10	"	"
	Spring run	27	"	"
	Dry creek	19	"	"
	Spring branch	12	"	"
	Tekama creek	59	"	"
	Spring branch	17	"	"
	slough	10	"	"
	slough	7	"	"

Across	Silver creek	54	feet	long
	Elm creek	27	"	"
	Wood creek	56	"	"
	South Blackbird creek	50	"	"
	North Blackbird creek	50	"	"
	Omaha creek	68	"	"

During the past summer we have constructed upon this road th following bridges:

Across	slough	15	feet	long.
	ditch	10	"	"
	ravine	18	"	"
	run and ravine	28	"	"
	run	30	"	"
	ravine and gulch	55	"	"
	ravine and gulch	20	"	"
	Badger creek	20	"	"
	Ayoway creek	56	"	"
	Do. do	20	"	"
	Do. do	20	"	"
	Do. do	20	"	"
	Do. do	30	"	"
	ravine	15	"	"
	Ravine creek	25	"	"
	Northwest Ayoway	30	"	"
	slough	10	"	"
	ravine and gulch	35	"	"
	Spring creek	20	"	"
	Dry ravine	15	"	"
	East Bow creek	50	"	"
	Middle Bow creek	78	"	"
	West Bow creek	50	"	"

The road, as located through the Omaha Reserve, passes along a high divide, and as it approaches Dacota City, which is situated upon the Missouri bottom, we had to descend a bluff bank of about 350 feet in height. This bluff was graded, under the immediate supervision of the engineer, by winding the hill with a side cut, in length one-half a mile, with a grade somewhat heavy, but over which a loaded wagon may pass without much difficulty. This, together with the grading near Pappillion creek, above referred to, was the principal part of earth work done during the season, with the exception of the necessary grading and embankments leading to and from the bridges.

By reference to my returns of the sale of property belonging to the United States, then in my possession, it will be seen that the sales amounted to the sum of $1,595 50. Owing to the great scarcity of money, I had every reason to believe that, at public auction, I would not have realized more than a nominal sum for the property. I therefore, under the verbal instructions of the general superintendent,

ffered the same at private sale—a part of which was so disposed of—
d, in the meantime, I caused handbills to be printed and sent to
e various parts of the Territory and adjoining Iowa, giving notice
a public sale of the property at Omaha City on the 15th September,
858. The property was offered on the 15th and 16th, but only a
ominal bid was received. The offering at private sale continued
ntil all the property was disposed of for a fair consideration, consid-
ing the scarcity of money.

In reference to the location of the road, the work done, the expendi-
ure of the money, and the management of the road generally, I
bmit the following extracts from a report of a select committee of
e council of the Territory of Nebraska, and unanimously adopted by
at body, who were appointed to examine into and report the facts,
c.:

“The select committee to whom was referred that portion of the
overnor's message relating to the wagon road from the ‘Platte river,
ia Omaha Reserve and Dacota City, to the Running Water river,’
nd for which $30,000 was appropriated by act of Congress approved
arch 3, 1857, respectfully report:

“The entire length of this road is two hundred and eight miles,
assing through a country of unsurpassed beauty and fertility; rich in
ineral wealth. Its course being almost parallel with the Missouri
iver, it crossed all the streams putting into said river. Being eligibly
ocated, the road is of incalculable benefit and importance to the
erritory, and its advantages can only be properly appreciated by the
migrant and hardy pioneer as he wends his way westward in quest
f a home he intends to reclaim from the possession of the red man,
nd improve, beautify, and adorn as a resting place for himself and
hose dependent upon his exertion and labor. In accordance with the
irection of the Secretary, during the past year the road, throughout
he entire distance, was opened and located by Henry B. Smyth, an
ngineer appointed by the governor, under the direction of the super-
ntendent.

“Under instructions of the Secretary of the Interior, no bridge was
o be constructed when a passable ford could be obtained. During
he summer and fall of 1857 passable fords were found across Moore's
reek, Lime creek, and Bazille creek. Subsequent experience has
hown the necessity of bridges across these streams; regarding not only
he convenience but the safety of the traveller. A change of the line
f road as located suggests itself from the frequent rains of the past
pring and summer between New York creek and Tekama, which will
ncur the erection of two bridges.

“The bridges which ought to be constructed to complete the whole
ine of road, as originally contemplated by the Secretary of the Inte-
ior, are as follows—the probable cost and length of which from esti-
mates furnished by the superintendent—viz:

ridge across	Moore's	creek,	65	feet, estimated cost......	$1,000
“ “	Pike's	“	39	“ “ “	650
“ “	Spring	run,	27	“ “ “	450

Bridge across Spring creek, 40 feet, estimated cost......	$650
" " " " 34 " " "	600
" " Omaha " 100 " " "	1,500
" " Lime " 50 " " "	850
" " Bazille " 125 { including piling and grading, }...	4,000
" " East Bazille " 40 feet, estimated cost......	700
Six bridges across ravines..........	1,600
Grading and contingencies	3,000
Total estimate..........	15,000

"The above estimates are based upon the hypothesis that the government directly constructs the bridges. Should the contract system be adopted, from 40 to 70 per cent. should be added to the above estimates and cost.

"The sum of $1,800 has been expended on grading, and the further sum of $6,000 in opening and locating said road and the purchase of property to aid in its construction.

"In the opinion of your committee, the early completion of this road is of inestimable importance and benefit to the Territory at large. Eminently calculated to develop its many, varied, and rich resources which are only awaiting the hand of labor to bid them forth; the opening of a safe thoroughfare to the rich and fertile valleys of the Running Water, the White Earth and the numerous streams that bring them tribute.

"Your committee would therefore recommend the passage of a joint memorial and resolution asking for an appropriation to aid in the completion of said road, for the bridging of the l'Eau qui Court, and the extension of the road to the military post of Fort Randall.

"In the opinion of your committee, the Territory is deeply indebted to the superintendent for the efficient and energetic management and early completion of a work so eminently adapted to the development of our resources, and for the economical and strict application of the funds appropriated, to the actual opening and construction of the road."

The erection of the bridges above estimated for are necessary to complete the road in the manner originally designed by the act of Congress. It will be of incalculable benefit to the Territory, and will induce an earlier settlement and development of the country. The pecuniary condition of the people of the Territory, brought on by the exorbitant prices they were compelled to pay for the necessaries of life, will not warrant an undertaking on their part to construct the bridges required for the accommodation of themselves, and indispensable to the emigrant; besides, some of these bridges are remote from settlements, and only of benefit to the traveller or emigrant.

The valleys of the several Bows and of the Running Water river are attracting settlers, notwithstanding the difficulties which now surround the upper part of the Territory. During the past summer about eventy families, in wagons, accompanied with their stock, have settled n the valley of the Running Water. These hardy pioneers, while hey brave the dangers and hardships of a frontier life, extending ettlement and cultivation, require and should receive all the benefits hat the government can consistently bestow.

In view of the great advantages that will accrue from so small an dditional expenditure of money, I earnestly recommend an appropriaion sufficient to complete this road as originally contemplated.

All of which is respectfully submitted.

I have the honor to be, very respectfully, your obedient servant,

GEO. L. SITES,
Superintendent Nebraska Wagon Road.

Hon. Jacob Thompson,
Secretary of the Interior.